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THESIS

METRICS FOR MONITORING SECTION 845 "OTHER TRANSACTIONS"

by

Peter G. Stamatopoulos

December 1999

Principal Advisor: David A. Smith
Associate Advisor: Bill Gates

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20000306 030

DTIC QUALITY INSPECTED 3

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	December 1999	Master's Thesis

4. TITLE AND SUBTITLE : METRICS FOR MONITORING SECTION 845 "OTHER TRANSACTIONS"

5. FUNDING NUMBERS

6. AUTHOR(S)
Stamatopoulos, Peter G.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Naval Postgraduate School
Monterey, CA 93943-5000

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
N/A

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES
The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT *(maximum 200 words)*

Recognizing the need to enhance flexibility and reduce the burden of Government-funded science and technology contracts, Congress crafted Section 845 Other Transaction Authority (OTA) to release Defense Advanced Research Projects Agency and the Services from complying with statutes and regulations in the FAR/DFARS procurement process. This greater flexibility was intended to attract commercial firms that normally would not do business with the Government, thus expanding the defense technology and industrial base. This study was conducted to identify and develop appraisal metrics that could be used to measure both the use and value of Section 845 OTs. The thesis also presents a survey of standard contract management metrics used by various buying organizations. The researcher found that survey respondents rated 13 standard contract metrics to be appropriate for Section 845 OTs; and, recommends establishing four measures to serve as a core set of metrics applicable to all Section 845 OTs.

14. SUBJECT TERMS	15. NUMBER OF PAGES
Section 845, Other Transactions, Contract Metrics, Metrics	188
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

NSN7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-1

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METRICS FOR MONITORING SECTION 845 "OTHER TRANSACTIONS"

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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
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ABSTRACT

Recognizing the need to enhance flexibility and reduce the burden of Government-funded science and technology contracts, Congress crafted Section 845 Other Transaction Authority (OTA) to release Defense Advanced Research Projects Agency and the Services from complying with statutes and regulations in the FAR/DFARS procurement process. This greater flexibility was intended to attract commercial firms that normally would not do business with the Government, thus expanding the defense technology and industrial base. This study was conducted to identify and develop appraisal metrics that could be used to measure both the use and value of Section 845 OTs. The thesis also presents a survey of standard contract management metrics used by various buying organizations. The researcher found survey respondents rated 13 standard contract metrics to be appropriate for Section 845 OTs; and, recommends establishing four measures to serve as a core set of metrics applicable to all Section 845 OTs.

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ACKNOWLEDGMENTS

Whatever the weaknesses of this study, they would have been far greater without the help and guidance of my advisors David Smith and Bill Gates, and Rena Henderson, my kind and patient editor.

I am extremely grateful for the sustained support, love and encouragement which my wife, Alaini, has provided over the years, whom I owe so much.

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I. INTRODUCTION

A. GENERAL

In February 1996, the Director of Defense Procurement (DDP), Office of the Under Secretary of Defense (OUSD), Acquisition and Technology (A&T) briefed the Defense Manufacturing Council (DMC) on Defense Advanced Research Projects Agency's (DARPA) use of Other Transaction Authority (OTA). [Ref. 1:p. 1] The briefing reviewed ten U.S.C 2371 instances of OTA and compared and contrasted OTAs with standard contract provisions. Some members of the DMC questioned why the Services were not using other transactions (OTs) to conduct research and development (R&D) and weapon systems prototype projects "better, faster, and cheaper." As a result, OUSD/DDP established an Integrated Product Team (IPT) to examine the potential to expand OTs in the Services.

In June 1996, the IPT released its findings in a Final Report. This report cited seven primary recommendations for increasing the Services' flexibility and encouraging them to use OTs for research and development projects. Recommendation number seven suggested the following action:

> Metrics that measure the use and value of 'flexible' cooperative agreements and Other Transactions need to be developed and employed. [e.g., this could be as straightforward as the

> number of non-traditional firms attracted.] [Ref. 1:p. 3]

The report cited six additional recommendations based on the assumption that the Services would be granted Section 845-type authority in Fiscal year 1997. Section 845 of the 1994 Department of Defense (DOD) Authorization Act broadened the use of OTs by giving DARPA the authority to carry out prototype projects directly relevant to weapon systems. Recommendation number six stated that the following action should be taken:

> Activities that enter into Section 845 transactions should develop and employ metrics that measure the use and value of Section 845 'Other Transactions' for prototype acquisitions. These metrics should provide insight into whether the 845 'other transactions' are 'better, faster, and cheaper' methods of conducting business. [Ref. 1:p. 4]

As a result of this report, OUSD (A&T) formed several IPTs, one of which focused on developing a common set of performance metrics applicable to OTs. Congress and OUSD (A&T) both considered metrics important from an oversight and internal management perspective. The intent of the Metrics IPT study was to provide OSD and the Services with a means of assessing the value of this authority; what goals did the Services hope to accomplish with OTA, and were they achieving those goals? It was also hoped that

the study would gather data upon which Congress could base a decision to extend OTA under Section 2371 of Title 10, United States Code (U.S.C.). [Ref. 2] Under 10 U.S.C. 2371, DOD is authorized to carry out research projects using "transactions other than contracts, cooperative agreements, and grants," also known as OTs. [Ref. 3] The authority is due to expire at the end of Fiscal year 2001. [Ref. 4]

The IPT's preliminary conclusion was that the Services were achieving some financial savings and shortening prototype cycle times. However, the IPT was uncertain how to effectively measure the benefits of OTs. One member of the IPT said:

> Team members need to better understand how OT's are being used before we reach agreement on the usefulness of metrics. Traditional contractors are doing business much differently these days, making access to sub-contractors more difficult. That's where the really technology is being exchanged. [Ref. 5]

For the period of fiscal years 1990 to 1997, the DOD issued 210 OTs and Section 845 prototype agreements valued at about $3.4 billion. [Ref. 6:p. i] In August 1998, the Office of the Inspector General, DOD (DODIG), released Audit Report 98-191 on the financial and cost aspects of OTs. [Ref. 6] The report reviewed 77 OTs from the Army Communications Electronics Command (CECOM), Air Force

Wright Laboratory, Defense Contract Management Command centers in Seattle and Syracuse, and DARPA valued at $1.7 billion. [Ref. 6:p. ii] The report concluded that the Services needed to improve their management controls of OTs; specifically, management had not devoted sufficient attention to developing metrics to quantify the benefits from using OTs. The report recommended that the Directors, Defense Research and Engineering and Defense Procurement, establish quantifiable performance measures to determine the costs and benefits of using OTs. [Ref. 6:p. 6]

B. OBJECTIVES OF THE RESEARCH

The primary objective of this research is to identify and/or develop appraisal metrics that measure both the use and value of Section 845 "Other Transactions." This research will also identify the broad range of quantitative and qualitative appraisal measurements (metrics) used in contract management.

C. RESEARCH QUESTIONS

1. Primary Research Question

To what extent are metrics used to measure standard contractual transactions appropriate to manage Section 845 "Other Transactions?"

2. Subsidiary Research Questions

Additional research questions are as follows:

1. What are Other Transactions, and how are they distinguished from standard contractual transactions?

2. What metrics are commonly used to manage standard contractual transactions?

3. To what extent are these metrics suitable for managing Other Transactions and Section 845 Prototype Transactions?

4. To what extent can new metrics be developed that are appropriate for managing Section 845 Other Transactions?

5. Can a core set of metrics, common to all Section 845 Other Transactions, be developed?

6. What are the advantages of developing metrics for managing Section 845 Other Transactions, and what are the barriers to implementing them?

D. SCOPE AND METHODOLOGY

To identify appraisal metrics that measure both the use and value of Section 845 OTs, the author first reviewed the relevant literature, including but not limited to the following:

1. References, publications and electronic media available at the Naval Postgraduate School.

2. Published academic text books and research papers.

3. Internet websites and homepages (DOD and academic).

The author then contacted Acquisition Professionals, Program Managers, and Contract Specialists from OUSD (A&T), Assistant Secretary of the Navy (Research, Development & Acquisition), Defense Advanced Research Projects Agency (DARPA), Office of Naval Research (ONR), Defense Logistics Agency (DLA), Defense Contract Management Command (DCMC), National Aeronautics and Space Administration (NASA), Department of Energy (DOE) and major DOD buying commands. The research involved two surveys and telephone interviews with at least one representative from each of these organizations. All respondents were assured of anonymity. The first survey was conducted to obtain current information on contract management metrics. The second survey was sent to senior-level acquisition professionals with experience in drafting and/or administering OTs. This methodology consisted of the following steps:

1. Conduct a thorough review to identify all contract management metrics currently being used by DCMC, NASA and major system buying commands.

2. Examine contract management metrics most applicable to R&D and prototype contracts.

3. Prepare a survey to target potential OT metrics.

4. Identify a common set of credible OT metrics.

5. Evaluate the benefits of OT metrics found by using the survey and interviews with senior-level acquisition professionals.

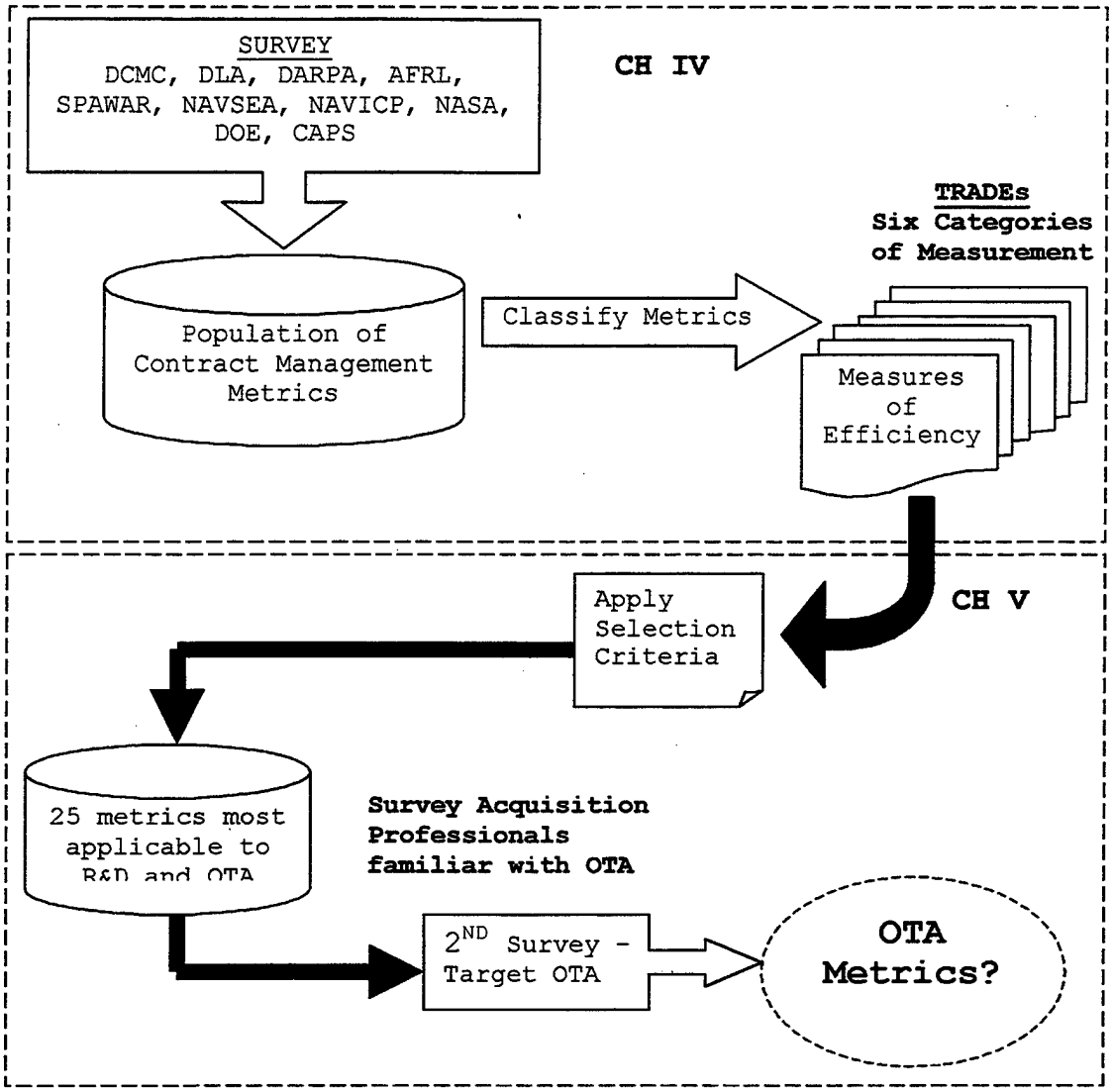

Figure 1.1. Research Methodology. [Source: Developed by Researcher]

E. ORGANIZATION OF STUDY

The thesis is divided into six chapters. Chapter I, the introduction, identifies the focus and purpose of the thesis and states the primary and subsidiary questions. Chapter II reviews the necessary background information on the legislative and operational intent of Section 845, "Other Transactions." Chapter III summarizes background information concerning metrics. Chapter IV categorizes and

analyzes information collected in the first survey. Chapter V analyzes the information collected in the second survey. And Chapter VI provides the study's principal conclusions and recommendations. The final chapter also answers the research questions and identifies areas for future study.

The thesis also contains four appendices. Appendix A provides a survey of Contract Management Performance Metrics currently being used by NASA, DOE, DCMC, and DOD buying commands. Appendix B provides a listing of contract management metrics by classification category. Appendix C provides a list of the 25 standard contract metrics subjectively determined to be most relevant to measuring OTs. And Appendix D presents a list of terms and definitions applicable to "other transactions."

F. BENEFITS OF THE STUDY

This study selects, from a broad range of contract management metrics, a core set of simple, accurate and credible metrics aimed at measuring the performance of Section 845 OTs. Such metrics would strengthen Congressional, OUSD (A&T), Defense Contract Audit Agency (DCAA), Services', and industries' understanding and belief in the authority. This ultimately serves both

Government and industry by cooperatively minimizing the costs of research and development projects. By surveying senior level acquisition managers who have used Section 845 OTA, this study will provide information beneficial to DOD buying agencies and acquisition professionals.

Additionally, this study will conduct a survey of contract management appraisal and monitoring metrics currently used by senior managers at DLA, DCMC, NASA, DOE, commercial firms, and major DOD buying commands. This survey could yield valuable information about the acquisition and contracting field in determining where future research may be required.

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II. OVERVIEW OF LEGISLATIVE AND OPERATIONAL INTENT OF SECTION 845 "OTHER TRANSACTIONS"

A. INTRODUCTION

This chapter provides background information underlying the Government's motive to develop an innovative approach to attracting commercial research and development (R&D) business through the use of Other Transaction Authority (OTA). This chapter will also discuss both the legislative and operational intent of Section 845 Other Transactions.

Three recent research efforts on OTs conducted at the Naval Postgraduate School (NPS) have provided much of the background information for this thesis. Each researcher focused on a specific area of OTA. Howell examined whether DOD could use OTs in lieu of the standard procurement system in applying commercial research and development efforts to military systems. [Ref. 7] Slade's research discussed using OTs in prototype development. [Ref. 8] Hayes' thesis developed an OT decision model. [Ref. 9]

B. THE MACRO ENVIRONMENT

1. Post Cold War

Unlike the cold war R&D effort that focused on fielding superior weapon systems at any cost, today's weapon systems must be both technologically superior and affordable. [Ref. 10] Today, DOD is shifting away from a world in which performance is the only consideration, towards a more balanced life cycle "cost of performance" view. [Ref. 11] This fundamental change in the way America develops and fields weapon systems reflects a dramatic shift from the Soviet Union as the known adversary to an environment in which there are diverse unpredictable threats. [Ref. 12:p. 6] Large, expensive weapon systems aimed to counter a known threat are giving way to highly technical, information-based weapon systems designed to detect, prosecute and integrate coordinated attacks on the agile threats expected in future conflicts. [Ref. 13:p. 21] This pursuit of high-technology weapon systems requires a more flexible acquisition approach than those used in the past. [Ref. 7:p. 9]

In the past, performance was not considered a tradeoff against cost in producing superior weapon systems. [Ref. 7:p. 9] However, today's military must consider cost when deciding which technologies and systems to pursue with

limited resources and defense dollars. As a result, Services are experiencing greater pressure to improve efficiency in the acquisition process to conserve valuable resources. To improve efficiencies in the acquisition process, DOD is striving to develop and procure weapon systems of tomorrow—better, smarter, cheaper and faster. [Ref. 14:p. 1] To accomplish this, DOD has focused on: promoting acquisition reform initiatives that reduce total cost and cycle times; improving efficiency of internal processes that have a major impact on cycle time; and reducing the time to develop and insert new technologies that improve war-fighting capabilities. [Ref. 14:p. 7]

2. The National Industrial Base

Since the end of the cold war, the defense industrial base has undergone significant changes in the form of mergers and acquisitions. While DOD purchases have declined, commercial markets have continued to expand, reducing DOD's spending role as a driving force for innovation. [Ref. 15:p. A20] The Services no longer dominate advanced technology. Many highly advanced "civilian" technologies are being developed, fielded and deployed by commercial firms well in advance of DOD's

requirements for the same technology. In fact, according to management consultant Robert Spreng:

> A significant share of the most valuable research and development activity in commercial companies is virtually unavailable to the Federal Government, despite the potential benefits to both parties. [Ref. 8, pp.3]

Within the past six years, Intel Corporation, International Business Machines (IBM), DuPont, and General Electric Company have either sold or shut down their defense R&D businesses. [Ref. 15:p. A20] According to the Director of Defense Reform, OSD, Stan Solaway:

> Three-quarters of the country's top 75 or so information-technology companies won't do research for the military. [Ref. 15:p. A20]

The disparity between the DOD's and the commercial sector's investment in R&D has been growing wider since the end of the cold war. [Ref. 15:p. A20] This difference means that relatively more of the nation's technological momentum will come from commercial enterprises rather than from defense programs. In 1971, the U.S. Patent Office awarded 1,271 patents to the Services, accounting for 1.6% of total patents issued. In 1998, the figure dropped to 585 or 0.4%. [Ref. 15:p. A20] Unlike the past, this role reversal has made it increasingly important for DOD to partner with industry to leverage commercial practices and

technological advances, and reduce barriers, such as those imposed by the FAR/DFARS. [Ref. 16:pp. 3-8] If DOD is to exploit advanced technology to develop, field and sustain superior weapon systems, it will have to rely increasingly upon the same industrial base that builds commercial products. [Ref. 7:p. 15]

3. Joint Vision 2010

Joint Vision (JV) 2010 boldly structures a conceptual framework for how our Armed Forces should approach the future. JV 2010 is built on the premise that modern and emerging technological innovation in the commercial market place will leverage our military's effectiveness in achieving full-spectrum dominance. To achieve this end, the Services must find ways to integrate emerging technological advances with innovative thinking. [Ref. 13:p. 11] JV 2010 advocates harnessing commercial innovation and exploiting dual-use technologies to maximize weapon system affordability. [Ref. 13:p. 32]

In this era of budgetary constraint, which threatens future investment in defense technology, dual-use and commercial off-the-shelf (COTS) technology is expected to decrease costs and shorten acquisition and development times. [Ref. 17] The National Security Strategy, along

with JV 2010, seeks to enhance the commercial and defense industrial base to better serve defense needs, promote U.S. economic competitiveness, and provide U.S. industry with the benefit of combined larger markets. [Ref. 12:p. 29]

4. Commercial Access

As described in JV 2010, the nation's Science and Technology program will help build a common industrial base using commercial practices, processes, and products. It will develop, wherever possible, technology for both military and commercial (dual-use) products and applications [Ref. 17:p. 32]. However, despite this clear vision statement, many commercial firms have avoided doing business with the Federal Government because of cumbersome requirements and regulations. [Ref. 15:p. A20] Businesses who might otherwise engage in joint civilian/military R&D endeavors have hesitated to participate because of issues of intellectual property rights, technical data rights, and certified cost and pricing data, just to name a few. [Ref. 7:p. 12]. Conversely, some military buying agencies have been reluctant to enter into R&D projects with commercial firms for lack of definitive requirements or structured agreements. [Ref. 18:p. 5]

5. The Need for an Alternative Approach

Under the auspices of the Department of Defense Science and Technology Strategy, DARPA, DOD's central R&D organization, has spearheaded efforts to tap into commercial advances in new technology. [Ref. 9:pp. 9-12] To help broaden their access to commercial firms not familiar or willing to conduct business with the Government, DARPA sought an alternative "contractual" approach to negotiating terms and conditions that is more flexible than the standard FAR contract or cooperative agreement. [Ref. 19:p. 35] Grants and cooperative agreements authorized under the Federal Grant and Cooperative Agreement Act (1978) did not allow DARPA enough contractual freedom to interact with high-technology commercial firms. [Ref. 20:p. 14] As a result, DARPA missed many opportunities to contract with companies developing new technologies.

> DARPA found that some of the most promising technical ideas were found in small start-up companies that were often made up of nothing more than the owners of intellectual property, the skills of their principals, and a few key employees. [Ref. 20:p. 14]

Many of DARPA's endeavors required consortium arrangements, which were not appropriate for standard contracts or cooperative agreements. Participants needed

to be recognized as peers or co-prime contractors in an arrangement that could be accomplished only through multi-party agreement. [Ref. 20:p. 14] DARPA believed OTs were ideal instruments for these agreements. [Ref. 21] The flexibility and cost-sharing attributes would allow consortium members to approach R&D projects from a different standpoint. In the past, the key question to answer was: "How much cost estimate can I sell my Government customer that will reduce my risk and maximize my fee?" Now, the key question would be: "How can we craft an agreement that will achieve goals at the least possible cost for all of us?" [Ref. 20:p. 38]

The biennial Goldwater-Nichols Act Implementation Report of 1988 questioned DARPA's inability to enter into cost-sharing and cost-recovery agreements to develop dual-use technologies. [Ref. 22:p. 4] The report recommended that DARPA be authorized to enter into "innovative contractual arrangements" that were in the best interest of the Government. [Ref. 22:p. 4]

C. LEGISLATIVE INTENT

In 1989, Congress enacted legislation under Section 2371 of Title 10, United States Code (U.S.C), giving DARPA the authority to enter cooperative agreements and "other

transactions" for advanced research projects. [Ref. 18:p. 2] Cooperative agreements are assistance instruments, rather than acquisition instruments, that are to be used only when the principal objective of a transaction is to accomplish a public purpose of support or stimulation authorized by Federal statute. [Ref. 23] The statutory criterion for choosing a cooperative agreement is that substantial involvement is expected between the executive agency and the state or local government, or other recipient, when carrying out the activity contemplated in the agreement.

The language, codified in 10 U.S.C. 2371, did not specifically define "other transactions." This gave DARPA the flexibility it desired to deal with unique situations encountered when fostering advanced technology, especially dual-use technology. [Ref. 1:p. 2] Although OT was not specifically defined, the Congress clearly intended this authority to support research performed by commercial firms.

> The Secretary of Defense, in carrying out advanced research projects through the (Defense) Advanced Research Projects Agency, may enter into cooperative agreements and other transactions with any person, any agency or instrumentality of the United States, any unit of State or local Government, any educational institution, and any other entity. [10 U.S. Code 2371]

Congress originally limited other transaction authority (OTA) to a two-year trial period and restricted its use to situations where standard contracts, cooperative agreements, or grants were not feasible or appropriate. In 1991, Congress made the authority permanent and amended 10 U.S.C. 2371, permitting the Services to use the authority. However, up until late 1993, the Services were required to obtain the Deputy Secretary of Defense's approval to use the authority; the result was that System Commands did not use OTs. [Ref. 1:p. 2]

In the Fiscal Year 1994 Defense Authorization Bill, Section 845, Congress amended OT authority for DARPA to include prototypes that are "directly relevant" to weapons or weapon systems "proposed to be acquired." [Ref. 8:p. 11] Commonly referred to as "Section 845 prototype authority," it was originally limited to three years. It was extended an additional three years by Section 804 of the National Defense Authorization Act for Fiscal Year 1997, Public Law 104-201, and made available to the Secretary of a military department or any other official designated by the Secretary of Defense.

The Dual-Use Application Programs (DUAP) and Commercial Operations and Support Savings Initiative (COSSI), under the Department of Defense's Science and Technology

Strategy, proved to be an opportune platform from which DARPA and the Services could gain access to commercial technology, using OT as its vehicle. [Ref. 24:p. ii] COSSI was created by Public Law 104-206 of the 1997 Defense Appropriation Act as part of DARPA's Dual-Use Application Program. [Ref. 25:p. 1] It was designed to reduce operating and support costs by inserting commercial technology and components into fielded military systems. The OTA was considered the best tool for achieving COSSI's goals of seeking cost-saving ideas from industry, experimenting with a new way of doing business, taking advantage of commercial technological advances, getting contractors to cost-share, and encouraging non-traditional suppliers to participate in the program. [Ref. 26]

The National Defense Authorization Act for Fiscal Year 1999, Public Law 105-261, Section 241, extended Section 845 prototype authority through September 2001. [Ref. 24:p. ii] Most recently, the National Defense Authorization Act for Fiscal Year 2000, Public Law 106-79, Section 801, amends Section 845 prototype authority by granting the Comptroller General authority to conduct audits subject to the following: [Ref. 27]

> Each agreement entered into by an official stated in subsection (a) to carry out a project in excess of $5,000,000 shall include a clause that provides for the Comptroller General, in the discretion of the Comptroller General, to examine the records of any party to the agreement or any entity that participates in the performance of the agreement. [P.L.106-79, Title VIII, sec.801(c)]

D. OPERATIONAL INTENT

1. Freedom from Mandates, Statutes, and Regulations

As previously mentioned, Congress made OT authority permanent in 1991 and amended 10 U.S.C. 2371 to include prototype projects for DARPA in 1994 and the Services in 1997. Recognizing the need to enhance flexibility and reduce the burden of Government-funded science and technology contracts, Congress crafted Section 845 OTs to release DARPA and the Services from complying with statutes and regulations in the FAR/DFARS procurement process. Freedom from mandates, regulations and statutes has been especially instrumental in resolving critical issues with commercial industry regarding intellectual property rights (IPR). [Ref. 7:p. 20]

2. Attracting Commercial Firms

A key feature of this authority is that most procurement statutes and Federal Acquisition Regulations (FAR) do not apply to OTs, allowing for greater flexibility

and a broader business strategy. [Ref. 5] This greater flexibility attracts commercial firms that normally would not do business with the Government, thus expanding the defense acquisition technology and industrial base. [Ref. 24:p. ii]

Despite improved flexibility, DOD Systems Commands did not use OTs until late 1993 because they were required to obtain pre-approval from the Deputy Secretary of Defense. [Ref. 1:p. 2] Instead, they used "flexible" cooperative agreements with industry and only managed OTs for DARPA projects using DARPA funds. According to the OUSD/DDP IPT's Final Report, there is a false perception among the Services that cooperative agreements are more flexible than OTs. [Ref. 1: Section IV] In actuality, cooperative agreements are very limiting because they are intended for R&D projects performed by universities and other nonprofit organizations. [Ref. 23]

Attempting to ease that restriction and reverse the cultural resistance and skepticism surrounding the authority, the Director for Defense Research and Engineering (DDR&E) issued interim guidance for the Services and DARPA on using OTs. [Ref. 1: Section IV] The guidance encouraged awarding agencies to consider the authority as an "opportunity" to develop innovative

approaches to research and prototype projects. DDR&E issued two Supplements to this guidance in 1997 and 1998, establishing policy that encouraged users to reduce administrative burdens, craft innovative agreements, and to seek waivers for regulatory requirements if necessary. [Ref. 1: Section IV]

Since DDR&E issued its interim guidance and supplements, Military departments and defense agencies have reported that OTAs enable program offices to establish business relationships that would be impossible under a procurement contract. [Ref. 24:p. ii] These relationships include awards to consortia; companies that typically do not do business with the government; commercial business units versus designated government business units within a parent corporation; educational institutions; and foreign contractors. They also permit traditional defense contractors to enter business arrangements with lower-tier contractors who normally would not be subcontractors under FAR-type contracts. [Ref. 24:p. 145] This enables traditional defense contractors to access technology that otherwise might not have been available.

For example, the U.S. Army Communication-Electronics Command recently awarded a $1.436 million Section 845 OTA to Raytheon TI Systems to design a Second Generation

Forward Looking Infrared (FLIR) Aviation Demonstrator. [Ref. 24:p. 140] The agreement, aimed at developing a secondary source of supply for the next-generation FLIR, has involved several different subcontractors who do not typically accept Government business due to excessive regulations, IPR constraints and Cost Accounting Standards (CAS).

According to Jasper, the essence of the OT arrangement is true teaming among all participants. [Ref. 28:p. 4] In 1995, the Institute for Defense Analysis (IDA) conducted a survey of organizations that participated in OTs with DARPA. The IDA findings confirmed the importance of building a collaborative relationship that works.

E. HOW SECTION 845 PROTOTYPE AUTHORITY DIFFERS FROM STANDARD CONTRACTUAL TRANSACTIONS

OTs are best described by what they are *not*. [Ref. 5] They are not contractual instruments, cooperative agreements or grants. Rather, they are funding transactions between Government and commercial firms or consortiums. [Ref. 29] Whereas FAR-type contracts are best suited for the buyer seller relationship, OTs involve R&D, stimulation, support, and close cooperation among participants. [Ref. 28:p. 6] OTs are relieved from many

mandates, statutes and regulations, which provides negotiators the flexibility to craft agreements that can address a broad spectrum of issues. [Ref. 4] Examples of some of these regulations are the Armed Services Procurement Act, Competition in Contracting (CICA), Contract Disputes Act, Public Law 85-804 Extraordinary Contractual Relief, Anti-Kickback Act, Procurement Integrity Act, Buy American Act, Service Contract Act, the bid protest system, and others. [Ref. 28:p. 3] It is important to note that this does not mean laws can be ignored. It does mean that flexibility is provided to come to agreement on terms and conditions that are of particular interest to the program. [Ref. 28:p. 3]

Using OTs provides the opportunity for participants to think outside the box. Contractors can establish separate cost centers that reduce overhead. [Ref. 28:p. 3] According to Jasper, proposal preparation and source selection times and cost may be reduced. Critical issues include intellectual property rights (IPR), patents, payment terms, cost-sharing arrangements, disputes, cost and accounting standards, just to name a few.

All terms and conditions are negotiated from a "best practice" position outside the realm of FAR/DFARS. This has made Section 845 OT attractive to commercial firms,

DARPA and DOD Systems Commands because it offers more flexibility and imposes fewer regulatory requirements than does a typical FAR contract. Conditions applicable to OTs are: [Ref. 29]

1. They are used only to carry out basic, applied, advanced research and prototype projects;

2. They are funding transactions that are not contracts, grants, or cooperative agreements;

3. To the maximum extent practicable, research must not duplicate research being conducted under existing programs carried out by the DOD;

4. To the extent the Secretary of Defense determines practicable, the funds provided by the Government should not exceed the total amount provided by other parties to the other transaction;

5. Other transactions may be used when the use of a standard contract, grant, or cooperative agreement is not feasible or appropriate.

The conditions of Section 845 OTs are the same as 10 U.S.C. 2371, except that they: [Ref. 29]

6. Do not require contractor cost matching;

7. Do not require determination that a contract, grant or cooperative agreement is not feasible or appropriate;

8. Require, to the maximum extent practicable, use of competitive procedures.

The major differences between OTs and standard contractual agreements are briefly explained below: [Ref. 29]

1. No DCAA involvement. Cost or pricing data may be obtained, but certification is not required. The commercial firm's auditors working the Section 845 agreement certify invoices for accuracy, allocability, and allowability. Some agreements have commissioned independent accounting firms to assure the "interests of all parties are protected." Generally Accepted Accounting Principles (GAAP) are followed.

2. Minimal DCMC involvement. DCMC assists issuing activities in developing solicitation packages and agreement terms. [Ref. 30:p. 3]

3. Comptroller General has the discretion to examine the records of any party to an agreement in excess of $5,000,000 for a period not to exceed three years after the final payment. [Ref. 27]

4. Minimum Socio-Economic Clauses. No Small Business Administration or "buy American" provisions in effect.

5. Flexible payment provisions. Invoices can include subcontractor work-in-progress, even if not yet paid.

6. Simplified dispute resolution. Disputes do not require contractor certification of claim or continued contractor performance. Disputes are ultimately resolved by a majority vote of a board consisting of the consortium members and an impartial third party. Disputes must be raised within 3 months instead of 6 years.

7. Cost Accounting Standards (CAS). Contractor must comply with the intent of the FAR coverage, but no DCAA involvement is required. Accounting practices can be changed unilaterally by the contractor during the course of the agreement.

F. SUMMARY

Arising from DARPA's desire to tap into the commercial market, OTA is an alternative approach to FAR-

type contracts. OTs are characterized by greater flexibility and innovation in R&D projects. They are intended to expand the military industrial market place by attracting R&D firms not used to, or familiar with, conducting Federal Government business. [Ref. 29] OTs allow contractors to consider new ways of doing business and permit strictly commercial firms access to DOD projects without having to change their existing business practices. [Ref. 28:p. 1]

The next chapter will explore performance metrics.

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III. PERFORMANCE METRICS

A. INTRODUCTION

This chapter introduces performance metrics, providing definition, purpose, attributes, benefits and concerns. The chapter describes categories used to classify metrics and a basic sequence for establishing metrics in an organization.

The research effort conducted by Gordon at the Naval Postgraduate School (NPS) on Metric Evaluation Approach for the Defense Acquisition Workforce Improvement Act provides a more comprehensive discussion of these issues. Gordon's study provided much of the background information for this chapter. [Ref. 39]

B. MANAGING PERFORMANCE

1. Why Measure Performance?

Appraising and controlling operations are usually the last steps in the management process. According to Dobler and Burt, no matter how well a business, program, or process is conceived or organized, a lack of proper controls or performance indicators can render it ineffective. [Ref. 31:p. 671] Executives and managers directing the efforts of an organization or a group have a

responsibility to know how, when, and where to institute a wide range of changes. They cannot implement these changes intelligently without knowledge of the appropriate information on which the changes are based.

Tracking and measuring performance is an inherent part of monitoring, controlling, and improving a process or activity; control and appraisal are, therefore, essential to achieving organizational goals and objectives. If managers are to manage programs and improve outcomes, they must measure performance. According to the Organization for Economic Cooperation and Development (OECD), an international public policy research institute based in Paris:

> The main objective of performance measurement in public organizations is to support better management decision-making leading to improved outcomes for the community, and to meet external accountability requirements. [Ref. 32:p. 1]

For this reason, managers measure performances to monitor, control, and improve at three levels of performance: organization, process, and job performance. [Ref. 33:p. 26] Organization measures serve the needs of the highest levels in the organization: corporate, divisional, and functional. An example of the organizational level would be ASN (RD&A)'s goal of reducing Total Ownership Costs to increase

resources available for re-capitalization and modernization. [Ref. 14] To achieve this goal, several of their performance measures are focused on acquisition reform initiatives aimed at improving efficiencies of processes that have a major impact on acquisition cycle times.

Process metrics measure performance of departments, product lines, and classes of service. In large organizations, such as DOD, there may be many layers of this category. For example, as the Head Contracting Agency for the Navy, Naval Supply Systems Command (NAVSUP) monitors the performance of the Afloat Purchase Card program by measuring both usage and delinquency rates, and, the number of purchase card software requests. NAVSUP monitors other process goals, of subordinate commands, including paperless acquisition initiatives and competition.

Job performance metrics gather basic data. They summarize the performance of specific processes, programs, functional areas, service cycles, and persons. [Ref. 34:p. 1.6] For example, the Naval Sea Systems Command (NAVSEA) measures staff workload performance, number of competitive awards, claims and protests, and closely monitors customer service.

2. What are Performance Measures?

a. Definitions

(1) Measurement: "(noun), the act or process of measuring; a data element having a dimension, capacity, or amount of something ascertained by measuring." [Ref. 35:p. 1]

(2) Metric: "(noun), a standard of measurement; a specialized measurement relating to measuring a process, or process step, under your direct control." [Ref. 35:p. 1]

(3) Performance Measure: "A generic term encompassing the quantitative basis by which objectives are established and performance is assessed and gauged. Performance measures include performance objectives and criteria, performance indicators, and any other means to evaluate the success in achieving a specified goal." [Ref. 34:p. 1.30]

The Metrics Handbook (METRICS), by U.S. Air Force Systems Command, provides a user-friendly working definition of metrics:

> Metrics are nothing more than meaningful measures. For a measure to be meaningful, however, it must present data that allow us to take action. Metrics foster process understanding and motivate action to continually improve the way we do business. This is distinguished from measurement, in that, measurement does not

necessarily result in process improvement. Good metrics always will. [Ref. 35:p. 1]

b. The Purpose of Performance Measures

Performance measures are usually approached from two directions: problem prevention and monitoring systems. [Ref. 31:p. 671] Regardless of the approach taken, establishing a realistic standard of performance that is accurate and accepted is the most difficult task. When properly designed, metrics can help managers accomplish organizational goals and objectives. [Ref. 31:pp. 674-675] Ideally, they help monitor requirements, predict outcomes, track progress, and lead to a better overall understanding of risk. [Ref. 36:p. 7]

Performance measures quantitatively tell us something important about our products, services, and processes by providing a single-dimensional or multidimensional quantitative measure. [Ref. 34:p. 1.4] An example of a single-dimensional performance measure would be: "Question: How many contractors bid for the project? Answer:10." Single-dimension measures usually represent fundamental measures of some process or product. [Ref. 34:p. 1.4] A multidimensional performance measure is expressed as a ratio of two or more units of measure. An example of a multidimensional performance measure would be:

"The number of on-time deliveries per total number of deliveries." Performance measures expressed this way almost always convey more information than do single-dimension measures. [Ref. 34:p. 1.4]

Common purposes for measuring performance according to Training Resources and Data Exchange (TRADE) include the following. [Ref. 34:p. 1.7]

a. Management Assessment

The purposes of management assessment are:

1. To know what is going on in the organization.
2. To aid in making decisions regarding resources, plans, policies, schedules, and structures.
3. To evaluate whether the organization is meeting value-added objectives.
4. To evaluate whether the organization is being effective and efficient
5. To communicate performance expectations to subordinates.

b. Self Assessment

The purposes of self assessment are:

1. To assess how well a process is doing, including improvements that have been made.
2. To identify performance that should be rewarded.

c. Control

The purposes of control are:

1. To identify performance disparities that should be analyzed and eliminated.

2. To provide feedback that compares performance to a standard.

d. Continuous Improvement

The purposes of continuous improvement are:

1. To help reduce process variation.

2. To identify defect sources, process trends, defect prevention, and to determine process efficiency and effectiveness.

3. Attributes of Metrics

Measuring the right variables has a lot to do with the likelihood of an organization's success. [Ref. 33:p. 26] According to Brown, to be a useful measure of performance, a metric should: [Ref. 37:p. 2]

1. Be meaningful to the customer.

2. Relate to organizational goals.

3. Be simple, understandable, logical, and repeatable.

4. Show a trend.

5. Be clearly defined.

6. Be economical to collect.

7. Be timely.

8. Drive the appropriate action.

Brown also advocates that metrics should start at the top and flow down to all levels in the organization; and, he

adds, whenever possible, they should be combined into a single index to better assess overall performance. In addition, metrics should have targets or goals based on research rather than on arbitrary numbers. [Ref. 37:p. 3]

4. Measurement Concerns

The use of performance measures is hardly new. Organizations have been measuring costs, quality, quantity, cycle time, efficiency, productivity, etc., and processes for as long as ways to measure those things have existed. [Ref. 37:p. 2] According to Brown, many buying organizations currently measure the same bottom-line-oriented performance metrics they measured twenty or more years ago. [Ref. 37:p. 3] What is new, though, is having those who do the work determine some of what should be measured so that they might better control, understand, and improve what they do. [Ref. 34:p. 1.1]

5. Using Measures Effectively

Effective use of measures means not only establishing them, but also using measures properly. According to Brown, the maximum number of metrics any organization should employ is 20. [Ref. 37:p. 4]

> Organizations should concentrate on measuring the vital few key variables rather than the trivial

> many. The key to defining a successful set of metrics is paring down your database to the vital few metrics that are easy to monitor and directly linked to key business drivers. [Ref. 37:p. 4]

Rumler and Brache developed the following three-step sequence for establishing measures in an organization. [Ref. 38:p. 142] First, the organization must identify the most significant outputs of the organization, process, or job—i.e., measure only what is important. Second, it must identify the "critical dimensions" of performance for each of these outputs. Critical dimensions should be derived from the needs of the internal and external customers who receive the outputs and from the needs of the organization. And, finally, the organization must involve employees in designing and implementing metrics, focusing on developing measures for each critical dimension. For example, if "attracting non-traditional defense firms" is a critical dimension, then one or more measures should answer this question: "What indicators will tell us if Section 845 OTs are attracting non-traditional defense firms?"

Selecting the right metrics or measures is much more than deciding what to measure. It is a key part of an overall strategy for success. [Ref. 37:p. 8] According to Brown:

> What is difficult is learning to measure the right things and ignoring other less useful, though interesting, data that do not contribute to your organization's success. Select the wrong performance metrics and you may not achieve your organization's goals, although all measurements indicate that you are healthy. Coming up with a good precise set of metrics is difficult and may require extensive research. [Ref. 37:p. 8]

Selecting the right performance measurement isn't management's only challenge. Brinkerhoff and Dressler addressed four measurement concerns when constructing metrics: validity, reliability, bias, and judgmental vs. nonjudgmental. [Ref. 39:pp. 18-22]

a. Validity

Validity is an important measurement factor that refers to the relationship between what is measured and the measurement's objective. [Ref. 39:p. 19] Validity is established when the metric is related to an event or object that can be controlled or manipulated. [Ref. 40:p. 38]

b. Reliability

Reliability refers to consistency, accuracy and precision in measurement. [Ref. 39:p. 19] Consistency is the metric's ability to produce the same results repeatedly. Accuracy involves the degree to which the measure reflects reality. Precision is the closeness of

repeated measurements to their mean value. [Ref. 34:p. 13] Figure 3.1 depicts the relationship between precision and accuracy.

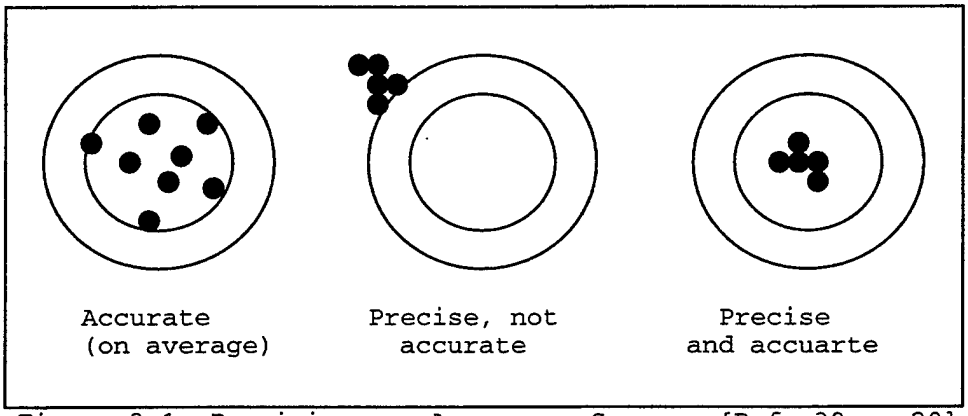

Figure 3.1. Precision vs. Accuracy, Source: [Ref. 39:p. 20]

c. Bias

A bias in a measurement system is best described as a tendency or inclination of outlook that is a troublesome source of error in sensing. [Ref. 34:p. 13] In this context, "sensing" refers to the measuring device (often human) that can detect some phenomenon. Bias is a serious measurement concern that must be avoided; however, it is hard to avoid and is often prevalent in surveys and customer questionnaires. [Ref. 39:p. 21]

d. Judgmental vs. Nonjudgmental

Another measurement concern regards the type of measure selected to evaluate performance—judgmental or

nonjudgmental. According to Gordon, judgmental measures typically deal in abstractions, while nonjudgmental measures are based on tangible data. [Ref. 39:p. 21]

Judgmental measures require discretion or judgement by the person taking the measurement. This involves collecting information, weighing its value, and using it to make a statement. Arguments against judgmental measures assert that they fail to adequately measure performance. [Ref. 39:p. 22] Another significant weakness of judgmental measures is grader bias, both inadvertent and intentional. For example, since a survey is prone to both researcher and respondent bias, it would not be considered an objective measure.

A nonjudgmental measure is definitive in nature, countable or quantifiable in some way. [Ref. 39:p. 22] Examples are time, cost, quantity, and so on, all of which are generally considered objective. According to Landy and Farr, "[t]he implication is that they are not open to interpretation, that they are unambiguous and reliable." [Ref. 41:p. 56] Whenever possible, nonjudgmental measures should be used to measure performance.

e. Measurement Paradigms

It is also important to recognize organizational paradigms that hinder the ability to accurately track and measure performance. [Ref. 42:pp. 58-60] Sink and Tuttle identified several barriers to implementing measurements that are dysfunctional in an organization:

1. Measurement is threatening. Workers often fear that new information about a process they perform or oversee may be used against them. [Ref. 42:p. 58]

2. Measurement has to be precise. Sink and Tuttle argue that performance measurement "does not have to be as precise as the measurement in a laboratory to be useful." [Ref. 42:p. 59]

3. Single indicator focus. When single indicators are used, there is a tendency to overreact to measurement results. An organization's overall performance cannot be adequately explained or measured by a single indicator. [Ref. 42:p. 59]

6. Classification of Metrics

TRADE classifies performance metrics using six categories of measurement (effectiveness, efficiency, quality, timeliness, productivity, and safety). [Ref. 34:p. 1.5] For the purpose of this research, the author will exclude the "safety" category since it does not pertain to measurement of other transactions. In its place, the author adds the more relevant category, "financial." Most

performance measures can be grouped into one of the following six general categories:

1. Effectiveness: A process characteristic indicating the degree to which the process output conforms to the requirement.

2. Efficiency: A process characteristic indicating the degree to which the process produces the required output at a minimum resource cost.

3. Quality: The degree to which a product or service meets customer requirements and expectations.

4. Timeliness: A measurement of whether or not a unit of work was done correctly and on time. Criteria must be established to define what constitutes timeliness for a given unit of work.

5. Productivity: The value added by the process, labor or capital consumed.

6. Financial: The dollar amount to perform a task or produce an output.

Each of these six categories measures performance rather than compliance. The difference between performance and compliance measures is that compliance measures evaluate whether something was accomplished, while performance measures evaluate how *well* something was accomplished. Measuring compliance is a much simpler, single-dimensional process. A compliance metric is often referred to as a "YES/NO" or "GO/NO GO" metric. [Ref. 33:p. 26] These six categories are shown in the first column of Table 3.1. The second column describes what is being

measured; and the third column gives an example of a metric.

Measure of...	Measures...	Example...
Efficiency	Ability of an organization to perform a task	Quantity of over-aged contracts for closure
Effectiveness	Ability of an organization to plan for output from its processes	Extent of commercial items procured
Timeliness	Whether a unit of work was completed on time	Purchase order cycle time
Quality	Whether a unit of work was completed correctly	Customer satisfaction rating
Productivity	The amount of a resource used to produce a unit of work	Awards and Modifications issued
Financial	The amount of dollars used to perform a task	Cost to Manage Contracts

Table 3.1. Classification of Performance Metrics. [Ref. 34:p. 24]

Research found that focusing performance measures on one class or category (e.g., quality or financial) is not the answer. [Ref. 37:p. 6] Rather, the key is to have a balanced approach covering several categories. The Navy Inventory Control Point (NAVICP) provides a good example. As a buying organization that provides supply support for weapon systems, they are primarily concerned with ensuring parts are available, on demand, for their customer base. As such, they have focused their contract performance measures on several areas to capture both the pre-award and post-award processes. [Ref. 43] For the pre-award processes, NAVICP monitors timeliness by measuring Procurement Administration Lead-time; productivity, by measuring the number of contracts that are in work-in-

progress; and financial, by monitoring the counts and dollar value of pre-award procurements. This balanced approach, across three categories, helps NAVICP managers monitor one of the most significant outputs of their organization, getting requirements on contract.

The Defense Contract Administration Command (DCMC) provides another example. Their focus is on the post-award process. To assist managers and customers in monitoring contract performance, many of DCMC's performance measures monitor timeliness and financial concerns. Examples of DCMC's measures of post-award timeliness include delivery-forecast timeliness, contract closeout cycle time, percent schedules on time, and schedule slippage of major programs.

Classifying metrics into relevant categories that identify a buying organization's critical dimensions and outputs is an important sequence in defining a successful set of metrics. Further analysis of metric classifications is beyond the scope of this thesis, but may warrant further research.

C. SUMMARY

This chapter provided background information on metrics, including definition, purpose, benefits, concerns, and classification categories.

In establishing metrics, the organization must remain focused on its most significant outputs and "critical dimensions" of performance. The key is to develop a few metrics that are easy to monitor and directly linked to key business drivers. The next chapter will present and analyze contract management metrics gathered from various buying organizations.

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IV. CONTRACT METRICS AND ANALYSIS

A. INTRODUCTION

The information presented in Chapters IV and V was gathered through surveys and telephone interviews with acquisition professionals from the Office of Under Secretary of Defense, Acquisition, Technology and Logistics (OUSD [AT&L]), Assistant Secretary of the Navy, Research, Development and Acquisition (ASN [RD&A]), Naval Supply Systems Command (NAVSUP), Defense Contract Management Command (DCMC), Defense Logistics Agency (DLA), National Aeronautics and Space Administration (NASA), Department of Energy (DOE), Defense Advanced Research Projects Agency (DARPA), Air Force Research Laboratory, various Department of Defense (DOD) buying commands, and commercial firms. All Government respondents were at least at the GS-14 level and were assured of anonymity.

A survey of Contract Management Metrics, hereafter referred to as the first survey, was conducted to obtain current information on contract metrics employed by various government and civilian organizations. This chapter will describe the methodology of the first survey, present a summary of data, and categorize and analyze the responses.

Chapter V will describe the methodology used for the survey on Section 845 Other Transaction (OT) Performance Metrics, hereafter referred to as the second survey. The chapter also will present a summary of the data and analyze the responses. The second survey had two objectives: to determine the extent to which metrics used to manage standard contract performance are appropriate to manage Section 845 OTs; and to determine the extent to which new metrics can be developed that are appropriate for measuring the use and value of OTs.

B. A SURVEY OF CONTRACT MANAGEMENT METRICS

1. Methodology

The first survey was conducted to obtain current information on contract management metrics used by various organizations. The survey was not intended to catalog the entire population of contract management metrics available, but, rather, to identify metrics monitored most closely by senior acquisition managers.

Fifteen organizations were surveyed. The author sought information from six Navy, one Air Force, and two DLA commands, three Defense Research Laboratories, NASA and DOE. In addition, to gain an industry perspective, the author obtained a listing of Standard Cross-Industry

Procurement Benchmarks, found in 1997 by researchers H. E. Fearon and B. Bales, from the Center for Advanced Purchasing Studies. [Ref. 44] All but two organizations responded to the request for information—an 87 percent response rate.

Based on the literature review and organization input, the author applied Training Resources and Data Exchange's (TRADE) metric classification scheme to the base population of contract management metrics identified in the first survey to analyze the results (Figure 4.1). A detailed review of TRADE's metric classification scheme is beyond the scope of this thesis; however, Chapter III outlines the highlights.

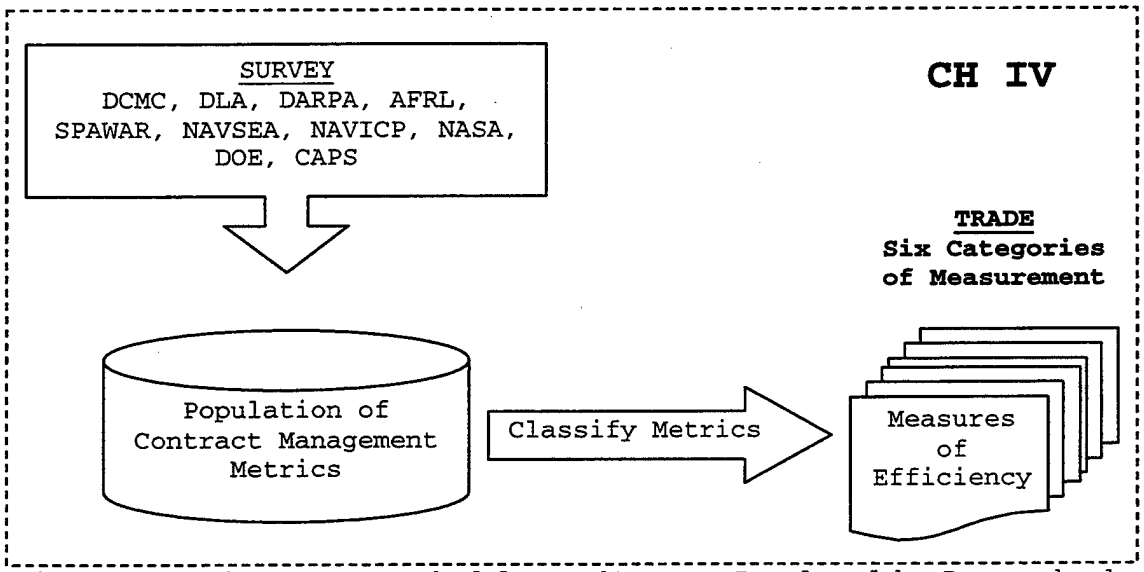

Figure 4.1. Chapter IV Methodology. [Source: Developed by Researcher]

As Chapter V will show, the researcher selected, from the population of contract management metrics, 25 metrics

subjectively determined to be most relevant to measuring OTs. This subset of the first survey serves as a base population for the study's second survey.

2. Subjectivity

Classification of the metrics identified in the first survey was a subjective process. Each of the six categories of performance measures (effectiveness, efficiency, quality, timeliness, productivity, and financial) possesses some degree of subjectivity. While the differences between categories was clear, they were not always obvious (mutually exclusive) and require intuitive interpretation. This problem was encountered most often when classifying efficiency, timeliness and productivity.

For example, the majority of Space and Naval Warfare Systems Command's (SPAWAR) contract metrics were classified as measures of efficiency since they were oriented towards measuring the benefits of electronic commerce and procurement automation. One SPAWAR metric tracked the number of awards and modifications transmitted electronically. From the researcher's perspective, data transmitted electronically may indeed measure efficiency; however, without knowing the objective of the metric, it is

unclear whether the measure is workload- (productivity), staff- (efficiency) or time-related.

Also, this research found that many of SPAWAR's efficiency metrics resembled other organization's productivity and timeliness measures. For example, NAVSEA and NASA track the number of contract awards and modifications as a single-dimension measure of productivity. This information is versatile and can also be combined to form multi-dimension measures applicable to financial, effectiveness, and efficiency metric categories. In the researcher's opinion, management should distinguish between the different categories and provide a direct link from measurement category, to metric, to a critical dimension or output of the organization.

3. Survey One Results

The survey asked for the following information: Please provide a detailed listing of contract management performance measures or metrics used by senior level mangers at your organization.

a. Data Presentation and Discussion

This question obtained current information on contract management metrics used by various buying

organizations. All but two organizations responded to the request for information, providing an 87 percent response rate. Survey results indicated twelve of thirteen (92%) respondents used metrics to measure the performance of their contracting organizations.

The research results indicated that DARPA does not measure the performance of its contract organization. Four respondents, DCMC, DLA, NASA, and DOE provided a formal list of contract management metrics. DCMC, DOE, and NASA metric listings included title, definition, measurement objective, computation methodology, data source, and frequency of measure. Organizations that were not able to provide formal metric listings provided information via copies of presentation slides, spreadsheets, or informal correspondence. Several respondents, interviewed by telephone, noted their organizations were in the process of reviewing contract performance metrics. A listing of contract management metrics used by organizations that responded to the first survey is presented in Appendix A.

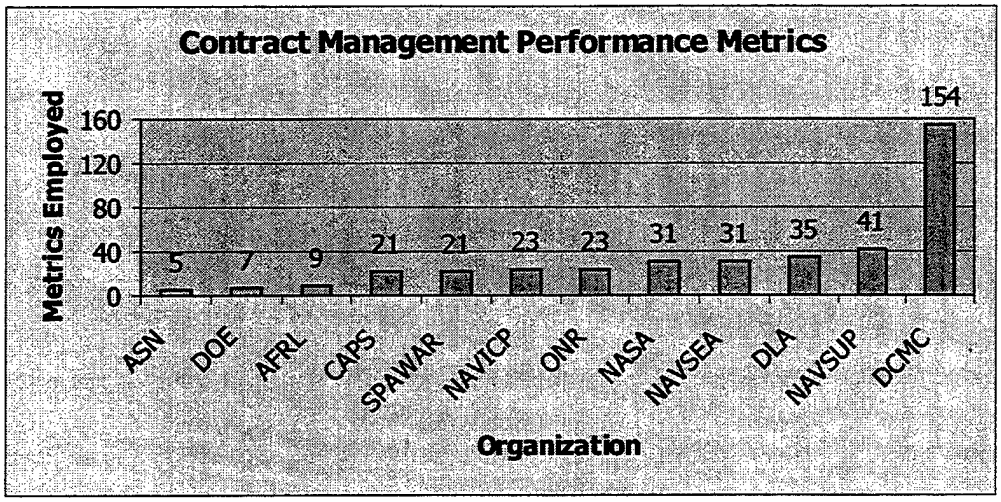

Figure 4.2. Contract Management Performance Metrics used by respondents. [Source: Developed by Researcher]

Survey results identified 401 metrics used to measure the performance of procurement organizations (Figure 4.2). DCMC employs 154 metrics designed to be used at all levels of the organization. DCMC's metrics are based on services it provides to its customers and are used to facilitate the organization's Business Plan and Mission Management Reviews. [Ref. 45] Since DCMC's primary mission is contract administration, this research focuses on metrics common to this functional area (e.g., contract closeout, overage undefinitized contract actions, negotiation cycle times, etc.). Many other metrics were used to measure internal management processes, special initiatives, unfair labor practices, and plant and manufacturing clearances. These metrics were not relevant to OTs and, therefore, were not exportable. Consequently,

130 DCMC metrics were found inappropriate for the purpose of this study.

DLA manages approximately four million consumable items valued in excess of $9.8 billion. DLA tracks 35 metrics oriented towards commodity management, forecast accuracy, inventory, space utilization, costs, customer service, and packaging. [Ref. 75] Based on their nature, the majority of these measures were not considered exportable to the R&D environment. Consequently, 30 DLA metrics were down-selected and found inappropriate for the purpose of this study. Subsequent research focused on the remaining 241 contract management metrics.

Based on the literature review, it appears that DOD organizations did not measure the use and value of OTs. All respondents, including those who did not provide information, confirmed that their organizations were not using metrics to measure the performance of OTs.

b. Analysis of the survey result

A comparison of performance metrics reveals procurement organizations measure similar contract management processes. Despite this apparent commonality, fewer than ten percent of the metrics identified shared the same title.

The literature review performed earlier in this research effort indicated that many buying organizations use the same metrics they measured twenty or more years ago. Twelve of thirteen respondents (92%) confirmed this expectation as valid. Only four organizations (NASA, DOE, NAVSUP, and DCMC) indicated that they had recently added at least one new contract management metric to their list of performance measures. Metrics considered "new" by one organization were, in many cases, considered standard by others. For example, NASA recently added procurement workload, cost-to-manage, and customer service measures to its list of performance metrics. NAVSUP, NAVSEA, and DCMC routinely monitor all three of these measures.

Respondents were expected to provide a detailed list of their organization's contract metrics, including title, definition, measurement objective, data source, computation method, and frequency of measure. Although all organizations used computer database systems to gather and assimilate performance measurement data, nine of thirteen organizations were unable to provide a formal listing of contract metrics. The four organizations that provided a listing had recently conducted a comprehensive review of their performance measurement systems. This analysis

indicates that 70 percent of the responding organizations were unable to produce a formal metric listing.

Several respondents interviewed by telephone revealed their concerns with performance metrics. Representative comments received included:

> We do not maintain a detailed listing of contract metrics. We do, however, measure a lot. Unfortunately, data seem meaningless and are often perceived as a burden to collect. Metrics need to be meaningful in order to be accepted.
>
> Our organization doesn't have a formal listing per se, but we do track numerous contract performance metrics. Perceptions in the office are mixed as to whether or not our measures are truly useful. Are we measuring just to measure, or for the purpose of managing? Different folks will give you different answers.
>
> Although we do not maintain a listing of contract metrics, I do believe it would be beneficial to our organization. Their current use and effectiveness [metrics] are spotty. What we need to do is to move towards a leaner, more meaningful set of metrics.

The researcher anticipated that the metrics provided would be identifiable by category (i.e., effectiveness, efficiency, quality, timeliness, productivity, and financial). Metrics provided by DCMC and NASA depicted the classification category of the metric. [Ref. 45] However, these were the only two of thirteen (15%) organizations that identified their metrics by category. The tendency for organizations to ignore metric

classification seems to indicate a lack of understanding of performance measures. Organizations should classify their metrics by category type. Classifying metrics into definable categories would assist managers in establishing effective measures that are focused on key business drivers.

Furthermore, the literature review revealed that focusing performance measures on one class or category is not prudent. Metric classification would enable managers to stratify their organization's performance measures to ensure a balanced approach covering several categories. The researcher believes that organizations should develop their own categories as appropriate, depending on their specific needs. Classifying metrics would also enhance an organization's understanding of its critical dimensions and important outputs.

The absence of standardization and metric classification in the first survey presented a challenge when applying selection criteria to identify the 25 metrics most relevant to OTs. The next subsection will classify the survey results by metric category to facilitate further analysis. As previously described, the intent of this study was to obtain current information on standard contract management metrics and to determine the extent to

which they would be appropriate to manage Section 845 OTs. Based on the literature review and survey size constraints, 25 metrics from the first survey were subjectively determined to be most relevant to measuring OTs. Those served as a base population for the study's second survey.

c) Classifying the survey results

Only 55 of 241 (23%) metrics were identified by category. To methodically select 25 metrics representative of a balanced approach, covering several performance categories, required classifying the remaining metrics according to TRADE's classification scheme outlined in Chapter III. While the differences between performance categories were clear, they were not always obvious and required intuitive interpretation. Classification results, as depicted in Figure 4.3, reveal: 29 metrics (12%) are used to measure the effectiveness of contracting organizations; 47 metrics (20%) are used to measure organizational efficiency; 32 metrics (13%) are used to measure quality of contracts and/or contract organizations; 43 metrics (18%) are used to measure the timeliness of various contract processes; 51 metrics (22%) are used to measure organizational productivity; and 39 metrics (17%) are used to measure financial concerns of organizations.

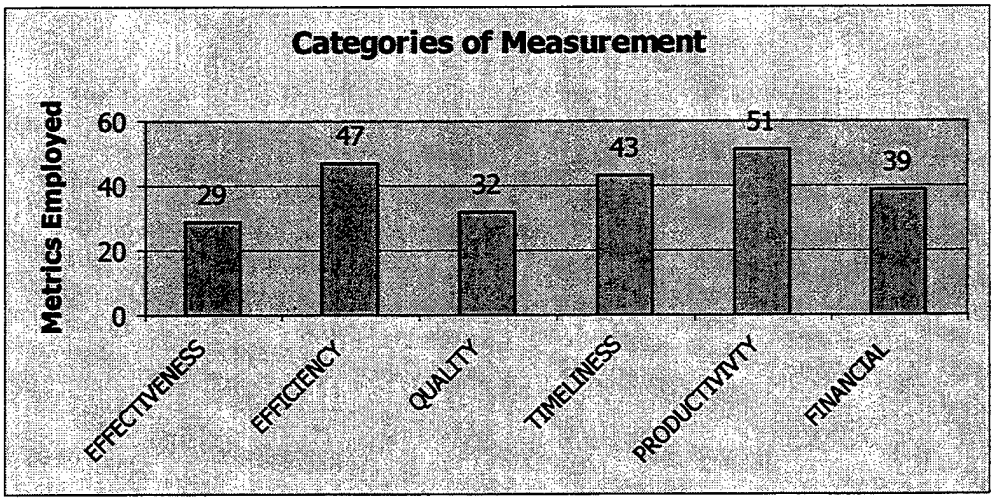

Figure 4.3. Categories of Measurement. [Source: Developed by Researcher]

The research identified 241 contract management metrics relatively evenly distributed across all six categories (Figure 4.3). This distribution did not hold true when categories were stratified by organization (Table 4.1 and 4.2).

	ASN	DOE	AFRL	CAPS	SPAWAR	NAVICP	ONR	NASA	NAVSEA	DLA	NAVSUP	DCMC	Total
EFFECTIVENSS		4			1	6	2	4	3	1	6	2	29
EFFICIENCY		1		9	16	2	4	3	3	1	5	3	47
QUALITY		1		1			3	3	12	2	7	3	32
TIMELINESS	3	1	5	1		5	3	5	6	1	7	6	43
PRODUCTIVITY			3	3	4	5	9	13	2		9	3	51
FINANCIAL	2		1	7		5	2	3	5		7	7	39
TOTAL	5	7	9	21	21	23	23	31	31	5	41	24	241

Table 4.1. Categories of Measurement. [Source: Developed by Researcher]

	ASN	DOE	AFRL	CAPS	SPAWAR	NAVICP	ONR	NASA	NAVSEA	DLA	NAVSUP	DCMC
EFFECTIVENSS		57%			5%	26%	9%	13%	10%	20%	15%	8%
EFFICIENCY		14%		43%	76%	9%	17%	10%	10%	20%	12%	13%
QUALITY		14%		5%			13%	10%	39%	40%	17%	13%
TIMELINESS	60%	14%	56%	5%		22%	13%	16%	19%	20%	17%	25%
PRODUCTIVITY			33%	14%	19%	22%	39%	42%	6%		22%	13%
FINANCIAL	40%		11%	33%		22%	9%	10%	16%		17%	29%

Table 4.2. Categories of Measurement by percentage. [Source: Developed by Researcher]

Results of the suggested classification, by category and organization, are summarized statistically in Tables 4.1 and 4.2. Table 4.2 depicts the percentage breakdown of classification categories by organization. Many aspects of the buying organizations are revealed in this breakdown. For example, as a post-award contract administration activity, DCMC metrics emphasize timeliness and financial measures. NAVSEA's Contracting Directorate, which provides contract support for Program Offices, focuses many of its metrics on quality (e.g., customer satisfaction, attitude, responsiveness, accountability of contract professionals, value received, claims and protests). SPAWAR's contract metrics are concentrated on measures of efficiency. This reflects the organization's interest in measuring the benefits of electronic commerce and data exchange. Appendix B lists contract management metrics by classification category.

The classification of metrics was a subjective process. Although the differences between categories was clear, they were not always obvious and required interpretation to classify. Many categories were not mutually exclusive. However, for the purpose of this study, each metric was assigned to only one category. Further comparison of organizations and analysis of metric

categories are beyond the scope of this thesis, but may warrant further research.

Classification results indicated that nine of twelve organizations (75%) measure the effectiveness of their contracts and/or contracting processes (Figure 4.3). Twenty-nine metrics were identified in this category. Nine metrics measured the effectiveness of competition and socio-economic goals. The remaining metrics captured information on Contract Administration Offices (CAO), contractor oversight, and product availability.

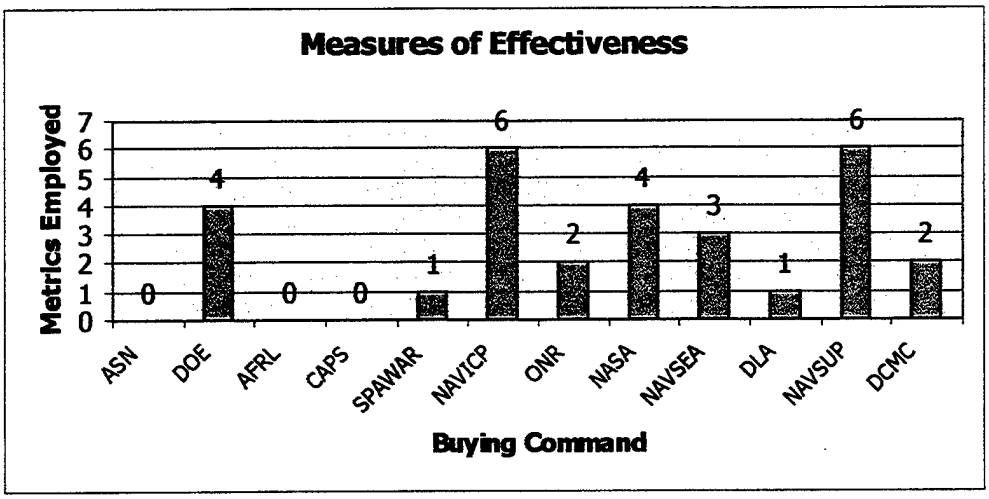

Figure 4.4. Measures of Effectiveness. [Source: Developed by Researcher]

Most of the measures in this category were nonjudgmental and quantifiable in some way. For example, NAVICP monitors the effectiveness of CAOs by measuring the total number of outstanding UCAs.

Classification results indicated that ten of twelve organizations (83%) measured efficiency. Forty-seven metrics were identified in this category (Figure 4.5). Sixteen (34%) measured staff workload, and 23 (49%) captured electronic commerce utilization rates. Compared to other organizations, SPAWAR measured the most in this category. Its metrics were oriented toward monitoring the benefits of electronic commerce and procurement automation.

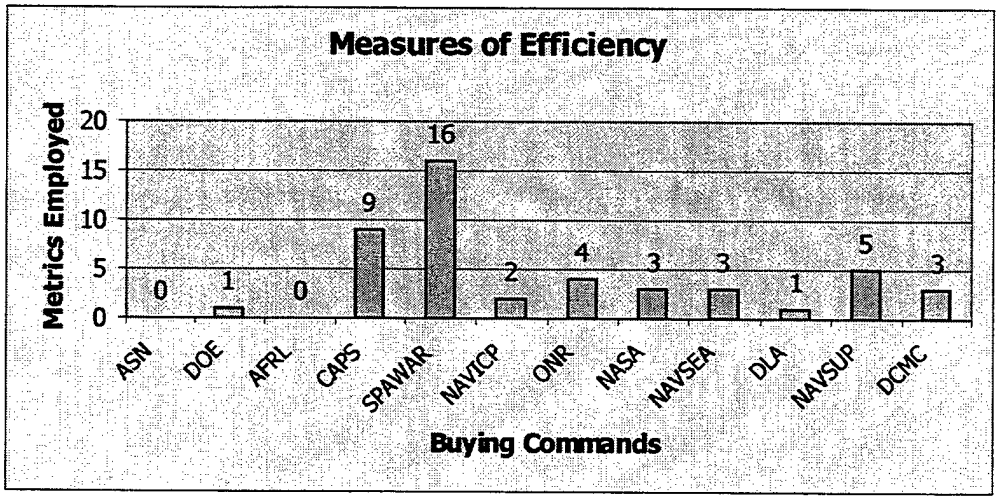

Figure 4.5. Measures of Efficiency. [Source: Developed by Researcher]

Classification results indicated that eight of twelve organizations (67%) measured the quality of their procurement processes and contracting staff. Thirty-two metrics were identified in this category (Figure 4.6). Within this category, 15 metrics (47%) monitored customer services; nine (28%) measured protest, claims, and grievances; and three (9%) measured training utilization

rates. The remaining metrics (16%) monitored Procurement Management Review results, audit follow-ups, and the completeness of contractor alert lists.

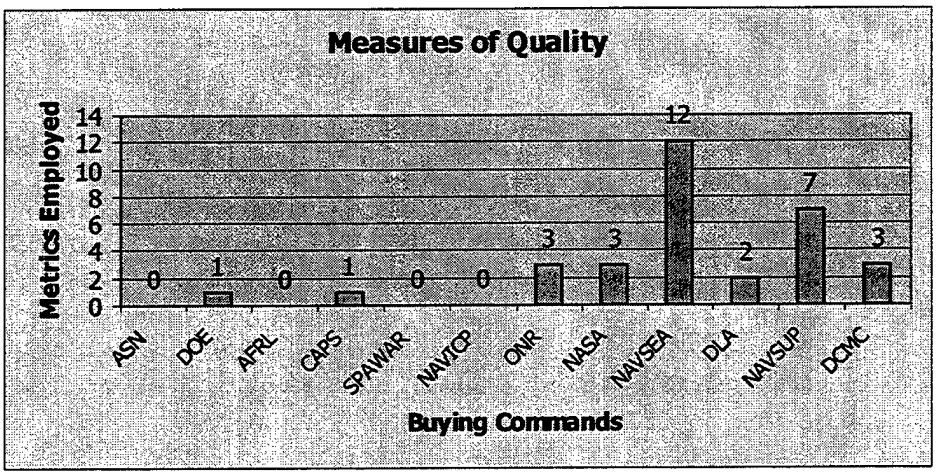

Figure 4.6. Measures of Quality. [Source: Developed by Researcher]

Compared to other organizations, NAVSEA dominated this category. Eight of its metrics monitored customer service factors from both a Program Office and a contractor perspective; and four measured the number of disputes, claims, protests, and contract cases in litigation.

Classification results indicated that 11 of 12 organizations (92%) measured the timeliness of their procurement processes. Forty-three metrics were identified in this category (Figure 4.7). Twenty-five (58%) measured procurement and negotiations cycle time. For example, DLA, NAVICP, NAVSUP, ONR, DOE and CAPS measure Procurement

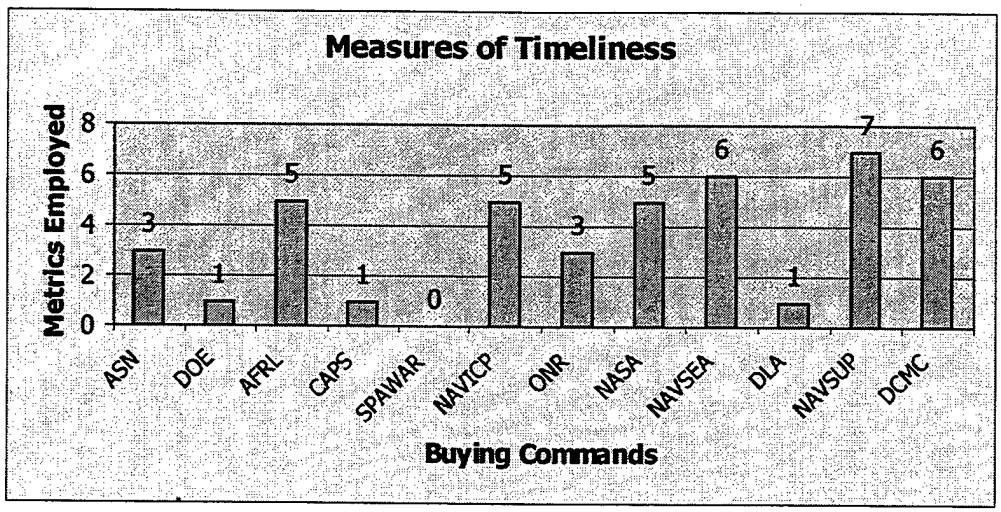

Figure 4.7. Measures of Timeliness. [Source: Developed by Researcher]

Administrative Lead-Time (PALT). Sixteen metrics (37%) measured the timeliness of contract closeouts, progress payments, undefinitized contract actions (UCA), and contract claims. None of SPAWAR's 21 contract metrics were classified in this category. The majority of SPAWAR's metrics combined attributes of both productivity and timeliness and, therefore, were better suited for classification under the category of efficiency.

Classification results indicated that nine of twelve organizations (75%) measured productivity. Fifty-one metrics were identified in this category (Figure 4.7). Based on the literature review, 46 were single-dimensional measures, which represent basic and fundamental measures of some process. Most metrics in this category captured either the numeric counts or dollar amount of contract

solicitations, awards, and modifications issued. Single-dimension measures of productivity are often combined to form multi-dimension measures used in other metric categories. Other measures captured the number of active suppliers, purchase card users, receipt transactions, and work-in-process by procurement types.

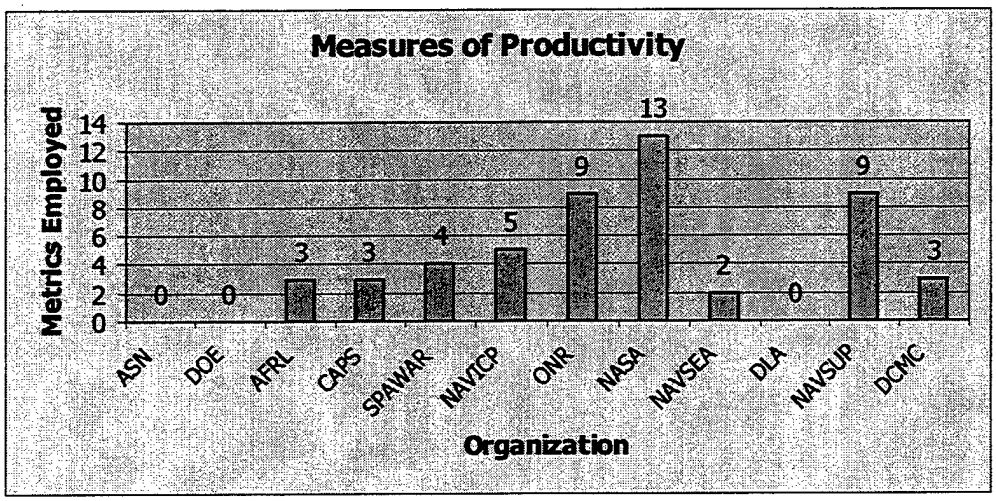

Figure 4.8. Measures of Productivity. [Source: Developed by Researcher]

Classification results indicated that nine of twelve organizations (75%) measured financial results. Thirty-nine metrics were identified in this category (Figure 4.9). Metrics from this category varied significantly, comprising single-dimensional, multidimensional and judgmental measures. Financial metrics focused on dollar values and counts, total ownership costs (TOC), cost to manage, cost avoidance, cost savings and contract delinquency. Many respondents

cautioned that financial metrics can be subjective. Some of these measures are: contracting officer price negotiations savings and cost avoidance; litigation cost savings and avoidance; process improvement cost savings and avoidance; and some cost to manage metrics.

Based on the literature review, judgmental measures contain significant weaknesses. Information collected usually involves weighing its value and is, therefore, subjected to grader bias. Managers should use nonjudgmental measures, whenever possible, to measure performance.

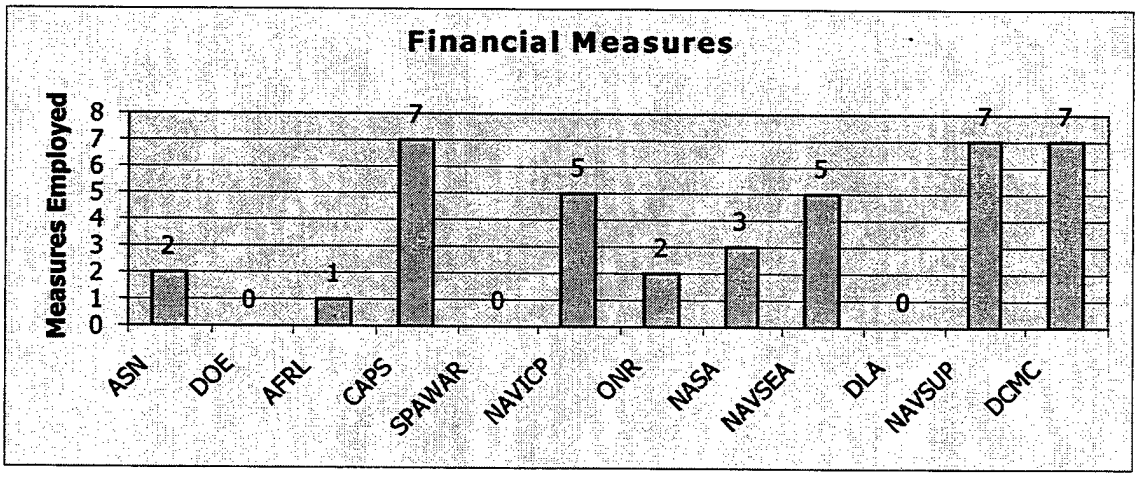

Figure 4.9. Financial Measures. [Source: Developed by Researcher]

C. SUMMARY

This chapter summarized the results of applying TRADE's metric classification scheme to the population of contract management metrics gathered in the first survey.

Prior to presenting this analysis, this chapter discussed the methodology of the study's first and second survey, and the subjective nature of classifying the metrics.

Chapter V will use a survey of defense acquisition professionals to further investigate the extent to which standard contract metrics are appropriate to measuring OTs. This chapter will first describe the methodology used to select the 25 metrics most relevant to measuring OTs. Then it will present the study's second survey and analyze the results.

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V. SURVEY OF OTHER TRANSACTION METRICS AND ANALYSIS

A. INTRODUCTION

Chapter IV identified 241 contract management metrics used by nine Department of Defense (DOD) organizations, the National Aeronautics and Space Administration (NASA), the Department of Energy (DOE), and the Center for Advanced Purchasing Studies (CAPS). The chapter summarized the results of applying Training Resources and Data Exchange's (TRADE) metric classification scheme to the population of contract management metrics and analyzed the results.

Chapter V will show how the researcher selected the 25 metrics most relevant to measuring Other Transactions (OT). This subset of the first survey served as a basis for the study's second survey. The second survey had two objectives: to determine the extent to which metrics used to manage standard contract performances are appropriate to manage Section 845 OTs; and to determine to what extent new metrics can be developed that are appropriate for measuring the use and value of OTs. Figure 5.1 illustrates the chapter's methodology.

Chapter V's analysis was conducted in two phases, each presented in a separate section. The first phase, presented in Section B, is a summary analysis of metrics assigned to

the six performance categories. This section also discusses the application of the researcher's metric selection criteria and problems encountered in its application.

The second phase, presented in Section C, will describe the methodology used in the second survey, summarize the data, and analyze the responses. This analysis identified a core set of metrics to measure the use and value of Section 845 OTs.

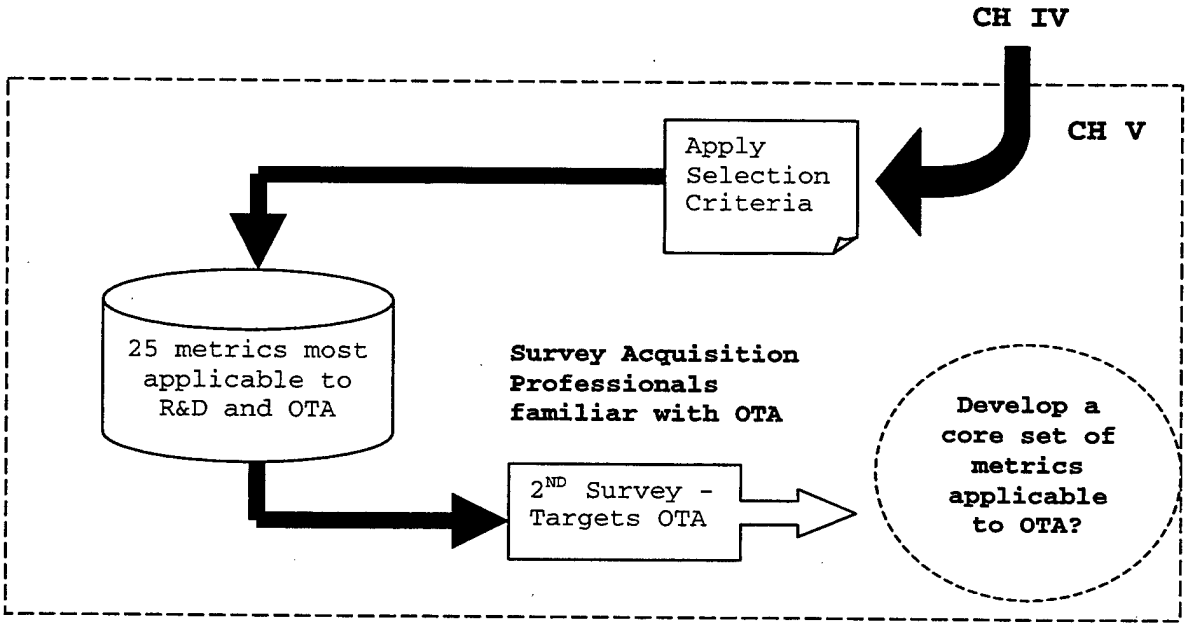

CH IV
CH V
Apply Selection Criteria
25 metrics most applicable to R&D and OTA
Survey Acquisition Professionals familiar with OTA
2ND Survey - Targets OTA
Develop a core set of metrics applicable to OTA?

Figure 5.1. Chapter V Methodology. [Source: Developed by Researcher]

B. OT METRIC SELECTION CRITERIA

1. Metric Selection Criteria

The researcher used four criteria to select the 25 metrics most relevant to measuring OTs. The first

involved selecting metrics that represented a balanced approach, covering all six performance categories (effectiveness, efficiency, quality, timeliness, productivity and financial). TRADE provides the following descriptions of the categories. [Ref. 34: p. 1-5]

Effectiveness indicates the degree to which the process output conforms to the requirement—awards issued to non-traditional defense contractors, for example. Efficiency indicates the degree to which the process produces the required output at a minimum resource cost—workload and staffing requirements for drafting and negotiating OTs, for example. Quality addresses the degree to which customer requirements and expectations are met; an example is measuring the value received from an OT. Timeliness measures whether or not a process was done correctly and on time, such as measuring the cycle time necessary to develop and insert a new technology. Productivity addresses the value added by the process, labor or capital consumed—the number of non-traditional contractors submitting OT bids, for example. And financial measures the dollar amount to perform a task or produce an output; examples are monitoring contractor cost share ratios and measuring the cost-to-manage postaward contract administration.

The second criterion selected metrics which were best suited for measuring the "use and value" of OTs, as recommended by the DOD Integrated Product Team's (IPT) Final Report on the Services Use of 10 U.S.C 2371 Other Transactions and 845 Prototype Authorities. [Ref. 1: p. 3-4] The IPT's report did not explicitly define the terms "use" and "value." Based on the legislative and operational intent of OTA derived from the literature review and telephone interviews with respondents, the researcher interpreted their meaning to be the ability of an OT to:

1. Attract new, non-traditional firms and businesses.
2. Tap into commercial technologies otherwise unavailable to DOD.
3. Shorten acquisition cycle time.
4. Enhance flexibility in the design and development process.
5. Achieve affordability goals.

The third criterion selected metrics that would support better management decision-making, as recommended by the Department of Defense Inspector General's (DODIG) Audit Report 98-191 on the financial and cost aspects of OTs. This report recommends establishing performance measures that include the amount of time required to award

an OT as opposed to a contract; the number of new products or processes established as a result of the OT; and how well Defense agencies are awarding, managing, and competing OTs. [Ref. 6: p. 16]

The fourth criterion selected metrics directly linked to the Assistant Secretary of the Navy, Research, Development and Acquisition (ASN [RD&A]) key business processes (e.g., reductions in acquisition cycle time and total ownership cost). [Ref. 37: p. 4] [Ref. 14]

2. Problems Encountered

In applying the selection criteria to the contract metrics, the researcher encountered two problems. The first, based on the literature review and telephone interviews with respondents, was the difficulty of defining the "use and value" of OTs. For the purposes of this study, the researcher interpreted their meaning according to the five definitions listed in the subsection above. However, each OT is unique; therefore, its use and value may differ, depending upon a wide array of goals specific to each program's needs.

This can be demonstrated by the U.S. Air Force's use of Section 845 OT on the Evolved Expendable Launch Vehicle (EELV) Program. [Ref. 24: p. 168] The OT allowed

Lockheed Martin to acquire superior Russian-made propulsion technology. The Russian technology was transferred, through Lockheed Martin, to a subcontractor and then used in production. This gave the EELV program an increased industrial base of both domestic and foreign sources from which to purchase advanced propulsion system technology. The OT enabled the EELV program to tap into commercial technologies otherwise unavailable to DOD.

The second problem was the necessary subjectivity in selecting the metrics most relevant to measuring OTs. This problem also cropped up when applying TRADE's metric classification scheme to the body of standard contract metrics. Subjectivity is an inherent problem in the selection and development of OT metrics, and should be taken into account when considering the results of this study.

3. Summary Analysis of Contract Metrics Most Relevant to OTs

Cumulatively, ten percent of the 241 contract management metrics were subjectively determined to be most relevant to measuring OTs. Table 5.1 and Appendix C list the 25 metrics the researcher selected.

METRIC	CATEGORY	ACTIVITY	CRITERIA
Awards and Modifications Issued	EFFECT	AFRL	3
Competition Goals	EFFECT	NAVSUP	3
Active Suppliers Per Purchasing Employee	EFFICIENCY	CAPS	3
Workload And Staffing	EFFICIENCY	NAVSUP	3
Reduce Total Ownership Costs (TOC): Development, Acquisition, O&S	FINANCIAL	ASN	4
Return-On-Investment (ROI) [TOC/INVESTMENT]	FINANCIAL	ASN	4
Cost-To-Spend A Dollar	FINANCIAL	CAPS	3
Cost-To-Manage	FINANCIAL	NASA	3
Solicitations Issued	PRODUCT	AFRL	2
Contractors Assigned Prime Contracts	PRODUCT	DCMC	3
New Contracts, Competitive/Non-Competitive	PRODUCT	NASA	3
New Financial Assistance Instruments (Grants, Cooperative Agreements)	PRODUCT	NASA	3
Contract Awards	PRODUCT	ONR	3
Customer Satisfaction	QUALITY	NAVSEA	2
Value Received	QUALITY	NAVSEA	2
Customer Service	QUALITY	NAVSUP	2
Reduce Time to Develop and Insert New Technologies	TIME	ASN	2
Reduce Major Product Cycle Time (Time to Develop & Field Major System)	TIME	ASN	4
Shorten Product Improvement Cycle (Time to Develop & Field Major Modifications)	TIME	ASN	4
Purchase Order Cycle Time (Days)	TIME	CAPS	3
Negotiation Cycle Time	TIME	DCMC	3
Lead Time	TIME	NASA	3
Timeliness	TIME	NAVSEA	3
Cycle Time Reduction	TIME	NAVSUP	4
Procurement Administration Lead Time (Contracts)	TIME	ONR	3

Table 5.1. 25 Contract Metrics Most Relevant to OTs. [Source: Developed by Researcher]

According to the literature review, focusing performance measures on one category is not prudent. Ideally, metrics should be classified into relevant categories that identify a buying organization's critical dimensions and outputs. Figures 5.2 and 5.3 summarize the results after applying the first selection set of criteria

to the 241 contract metrics. The metrics selected represent a balanced approach that covers all six performance categories (effectiveness, efficiency, quality, timeliness, productivity and financial).

	1st Survey	Percent	Metrics Selected for 2nd Survey	Percent
EFFECTIVENSS	29	12%	2	8%
EFFICIENCY	47	20%	2	8%
QUALITY	32	13%	3	12%
TIMELINESS	43	18%	9	36%
PRODUCTIVITY	51	21%	5	20%
FINANCIAL	39	16%	4	16%
TOTAL	241	100%	25	100%

Figure 5.2. Summary of Contract Metrics by Category. [Source: Developed by Researcher]

When comparing the two surveys in Figure 5.2, analysis indicates a bias in the measures of efficiency and timeliness. The researcher attributes the efficiency bias (20%) to 16 SPAWAR metrics, identified in the first survey, which measure the benefits of procurement automation. If removed, the results of the first and second surveys are more closely aligned at 13% and 8% respectively.

Figure 5.2 also indicates a bias toward timeliness measures (36%). The researcher attributes this bias to a theme consistent throughout the literature review and in three out of four of the researcher's selection

criteria. Shortening acquisition cycle time and reducing the time required to award an OT were cited in the DOD IPT's Final Report, DODIG Audit Report 98-191, and ASN (RD&A)'s 1999-2004 Strategic Plan.

Figure 5.3 is a breakdown of the performance categories and organizations from which the 25 metrics were selected. The Air Force Research Laboratory, Office of Naval Research, Naval Sea Systems Command and Defense Contract Management Command all have experience drafting and/or administering OTs.

	ASN	AFRL	CAPS	ONR	NASA	NAVSEA	NAVSUP	DCMC	Total
EFFECTIVENSS		1					1		2
EFFICIENCY			1				1		2
QUALITY						2	1		3
TIMELINESS	3		1	1	1	1	1	1	9
PRODUCTIVITY		1		1	2			1	5
FINANCIAL	2		1		1				4
TOTAL	5	2	3	2	4	3	4	2	25

Figure 5.3. Metrics by Organization & Category. [Source: Developed by Researcher]

Figure 5.4 summarizes the results of applying the second, third, and fourth selection criteria to the 241 contract metrics. Results reveal that five metrics (20%) were selected based on the second criterion; 15 metrics (60%) were selected based on the third criterion; and five metrics (20%) were selected based on the fourth criterion.

	ASN	AFRL	CAPS	ONR	NASA	NAVSEA	NAVSUP	DCMC	Total
CRITERIA 1									ALL
CRITERIA 2	1	1				2	1		5
CRITERIA 3		1	3	2	4	1	2	2	15
CRITERIA 4	4						1		5
TOTAL	5	2	3	2	4	3	4	2	25

Figure 5.4. Metrics by Organization & Selection Criteria. [Source: Developed by Researcher]

Based on the criteria established by the researcher, 25 standard contract metrics were selected to be most relevant to measuring OTs. These metrics represent a balanced approach across all performance categories and were selected to emphasize recommendations made by both the DOD IPT and DODIG Audit Report.

C. A SURVEY OF OTHER TRANSACTIONS

1. Methodology

The previous section described how the researcher subjectively determined the 25 metrics most relevant to measuring Other Transactions (OT). This subset of the study's first survey serves as a basis for the second survey.

This section will describe the methodology used in the second survey, present a summary of data, and provide an analysis of the responses. The information in this section

was gathered through a survey of 35 acquisition professionals from various DOD organizations familiar with OTs. Twenty responded—a 57-percent response rate. All Government respondents were at least at the GS-12 level and had experience drafting or administering at least one OT. Respondents were encouraged to answer freely on a non-attribution basis.

The second survey had two objectives: to determine the extent to which metrics used to manage standard contract performances are appropriate to manage Section 845 OTs; and to determine the extent to which new metrics can be developed that are appropriate for measuring the use and value of OTs. Another aim of the survey was to determine the extent to which OTs contribute to reductions in cycle time and total ownership cost. Central to the study is the assumption that respondents are best able to address the relevance of Section 845 OT metrics, their significant outputs and critical dimensions. This assumption is based upon the fact that Section 845 OTA is applicable across all the DOD Services.

The researcher based the survey's 12 questions on the literature review conducted in Chapter III and the analysis presented in Chapter IV. Respondents were encouraged to elaborate on any response. The survey was not intended to

be a statistically significant sampling of responses, but, rather, a collection of opinions.

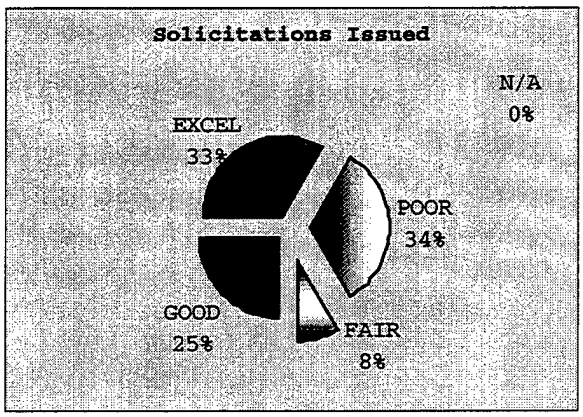
2. Second Survey Results

The purpose of this series of questions was to survey acquisition professionals to determine how appropriate the researcher's 25 standard contract management metrics were for managing Section 845 OTs. Respondents were provided definitions of the metrics and rated each on the basis of their appropriateness for measuring Section 845 OTs. Respondents selected from five choices: poor, fair, good, excellent, and not applicable. DCMC respondents, who had only post-award OT experience, did not rate several metrics in question one. According to COL Hanson, Defense Contract Management Command-Syracuse, "DCMC doesn't get involved in the pre-award action enough to comment on the appropriateness of some metrics presented in the survey." Question number one and the 25 metrics are presented below.

a. Responses to Question Number One

The first survey question was: To what extent are these metrics used to manage standard contractual transactions appropriate to manage Section 845 Other Transactions? The 25 metrics and the respondents' evaluations of each are shown below.

(1) Solicitations issued. *Definition: The quantity of solicitations issued per project or reporting period. This metric is used to track workload data for internal and external customers.*



One of the purposes of OTA is to encourage more contractor participation in research and development projects. Metric 1.1 was intended to solicit the value in measuring the number of OT solicitations sent to potential contractors. Fifty-eight percent of the respondents rated this measure either good or excellent. The remaining respondents (42%) felt the appropriateness of this measure was poor (34%) or fair (8%). Zero respondents rated the metric not applicable. Six DCMC respondents elected not to rate the metric.

The researcher expected more support for this measure and believes it provides an indication of competition achieved. In the researcher's opinion, the

metric indicates the commercial sector's willingness to respond to OT bids, as well as the buying organization's propensity to seek out new commercial sources. According to Diane Thornwell, director of SPAWAR's Space Systems Contracting Division, "the acquisition community needs to do a better job at seeking out new firms for OT business." Most of the respondents who perceived OTs as valuable cited their ability to attract new contractors. Some representative comments are presented below:

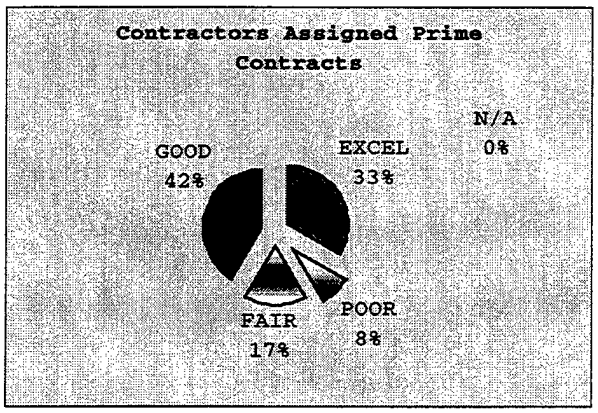
> We should be using them [OT] to attract new companies and new technologies. As well as entering into new partnerships with existing contractors that we couldn't get access to by using traditional FAR contracts.
>
> In my mind the value of 845 OTs is attracting non-standard companies. Our focus should be on the success of doing that.

(2) Contractors assigned prime contracts.

Definition: The quantity of contractors under the cognizance of the buying command who have open prime contracts on-hand at the end of the period. This metric is tracked for internal and external customers, and for workload indicators.

Metric 1.2 represents a single-dimension measure of productivity. This type of metric is often combined with other single-dimension measures and used to

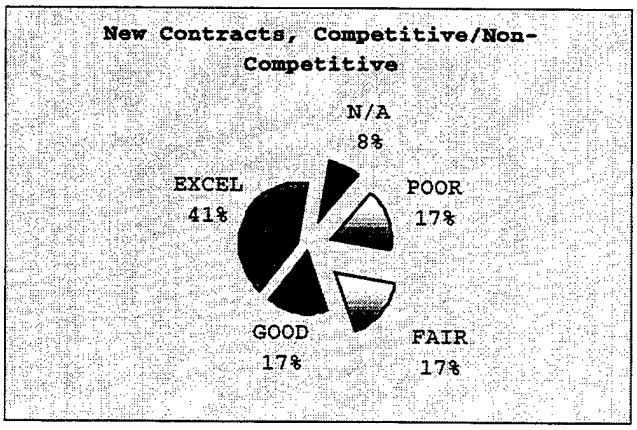
monitor effectiveness, efficiency and financial concerns. Seventy-five percent of the respondents rated this metric good or excellent. Twenty-five percent of the respondents rated the appropriateness of this metric as poor (8%) or fair (17%). Zero respondents rated this metric not applicable. Six DCMC respondents elected not to rate the metric.



(3). New contracts, competitive/non-competitive. *Definition: The quantity of competitive and non-competitive contracts under the cognizance of the buying command who have open prime contracts on-hand at the end of the period. This metric is tracked for internal and external customers, and for competition indicators.*

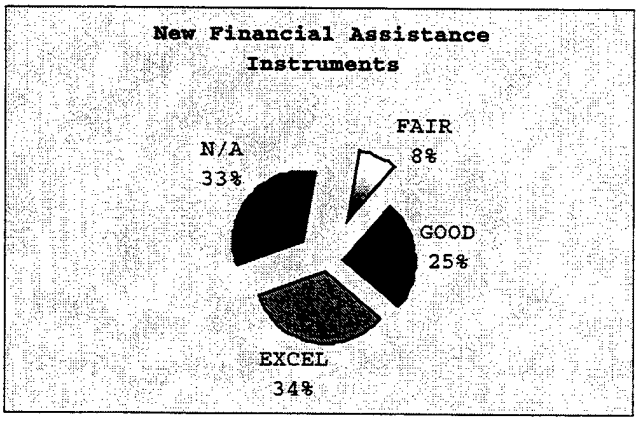
Metric 1.3 solicits the value of comparing the number of OT awards made on a competitive versus non-competitive basis. Fifty-eight percent of the respondents rated the metric good (17%) or excellent (41%). Forty-two

percent rated the appropriateness of the metric fair (17%), poor (17%) or not applicable (8%). Six DCMC respondents elected not to rate the metric.



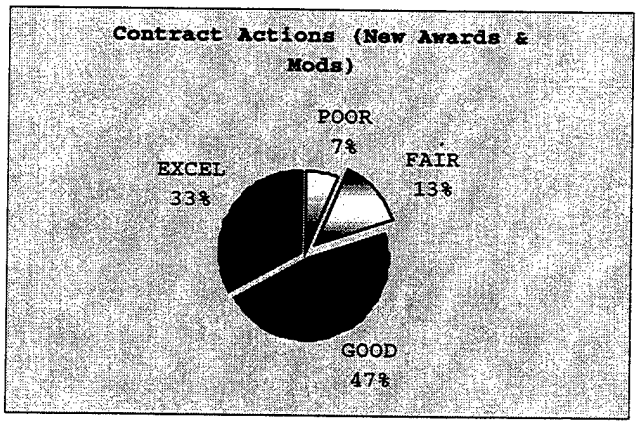
(4) New financial assistance instruments.

Definition: The quantity of new financial instruments (grants, cooperative agreements, or other transactions) under the cognizance of the buying command at the end of the period. This metric is tracked for internal and external customers, and for workload indicators.



Metric 1.4 determines the value of measuring the number of OT awards. Sixty-seven percent of the respondents rated the measure as fair (8%), good (25%) or excellent (34%). Zero respondents rated the metric poor. Other than six DCMC personnel who elected not to rate the measure, 33% of the respondents felt the measure was not applicable.

(5) Contract actions(new awards & modifications). *Definition: The quantity of contract actions (awards and modifications) under the cognizance of the buying command at the end of the period. This metric is tracked for internal and external customers, and for workload indicators.*



Metric 1.5 was intended to be similar to the previous question. Contract actions and new financial instruments are essentially the same measures. Both are

single-dimension and capture information for workload and other metrics. Eighty percent of the respondents rated the measure as good (47%) or excellent (33%). Twenty percent of the respondents felt the measure was poor (7%) or fair (13%). Zero respondents rated the metric not applicable, and four DCMC respondents elected not to rate the metric.

Comparing the responses to metrics 1.4 and 1.5 shows that respondents are willing to measure the number of OT awards. A small percentage of respondents who indicated that the metrics were poor or not applicable generally felt that any requirement to measure OTs would defeat the purpose of commercial streamlining. Representative comments included:

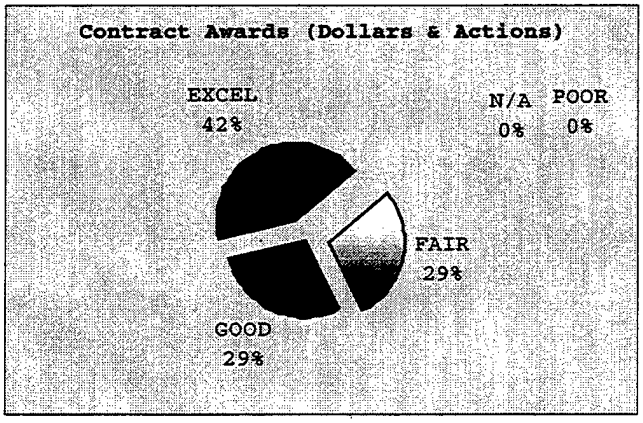
> Any requirements to measure defeat the purpose of commercial streamlining. If we start measuring it usually means that auditors will soon follow and next thing you know we'll be playing by some other organization's rules.
>
> One very basic concept of OTA is to reduce burdensome requirements. So by developing metrics we impact that basic premise.

(6) Contract awards (dollars & actions).

Definition: The number of contract awards by fiscal year, type, and dollar range.

Metric 1.6 was intended to see if respondents rated contract awards, contract actions and new

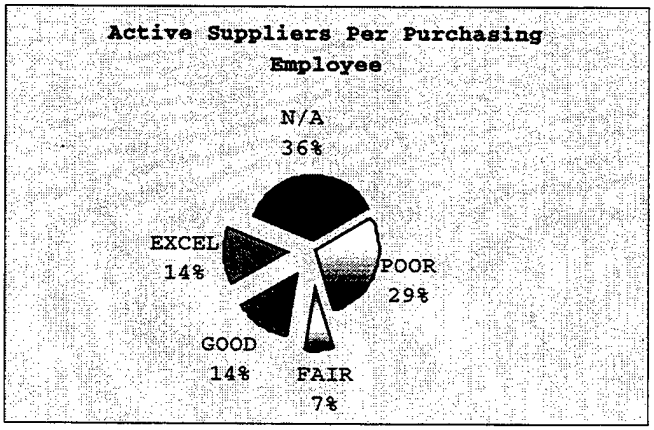
financial instruments the same. One hundred percent of the respondents rated the measure as fair (29%), good (29%) or excellent (42%). Zero respondents rated the metric not applicable or poor. Four DCMC respondents with post-award OT experience elected not to rate the metric. Comparing the responses to metrics 1.4, 1.5, and 1.6 confirmed that the metrics are considered similar and appropriate for measuring OTs.



(7) Active suppliers per purchasing employee. *Definition: Total number of purchasing employees engaged in award and/or administration per active suppliers.*

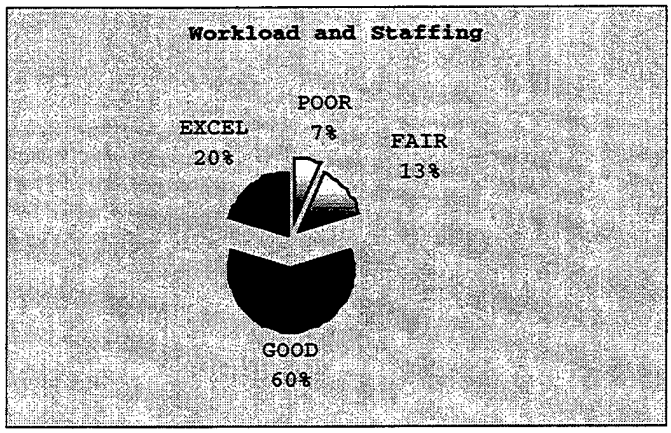
Metric 1.7 determined whether respondents felt this workload indicator was relevant to OTs. Seventy-two percent of the respondents rated the metric either not applicable (36%), poor (29%) or fair (7%). Twenty-eight percent rated the metric as good (14%) or excellent (14%).

Four DCMC respondents elected not to rate the metric. The researcher believes workload indicators can be valuable, but agrees with the majority of respondents that this metric's utility is marginal given the relatively low number of OTs being awarded.



(8) Workload and staffing. *Definition: Ratio of the quantity of contract actions (awards and modifications) under the cognizance of the buying command at the end of the period to the total number of contracting employees.*

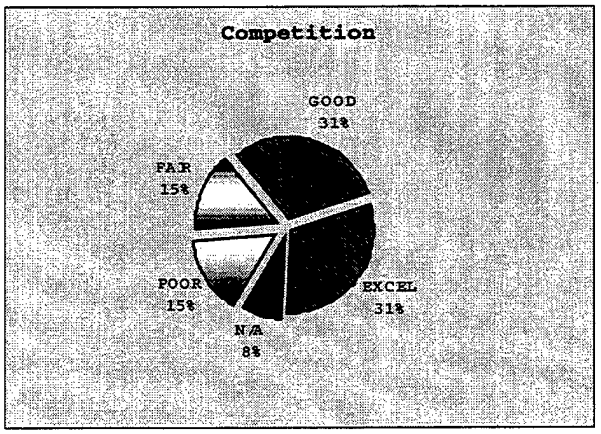
Metric 1.8 was also used to determine the relevance of workload measures to OTs. Respondents appeared to be more familiar with this metric than with the previous ones. Ninety-three percent rated the metric as fair (13%), good (60%) or excellent (20%). Zero respondents rated the metric not applicable, and only



seven percent rated it as poor. Three respondents from DCMC elected not to rate the metric. The researcher believes that the following comment made by one respondent is indicative of the tendency to accept this metric:

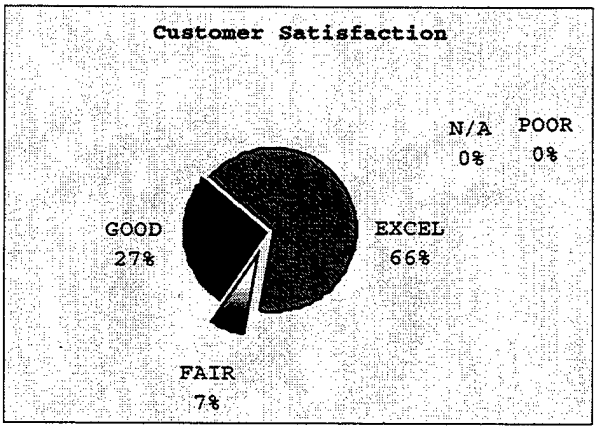
> Though OTs are unstructured, they require a great deal of time and effort to draft and administer. Management hasn't yet decided how many people resources are needed to efficiently carry them out.

(9) Competition. *Definition: The extent of competition achieved.*



One of the purposes of OTA is to attract new businesses and enhance competition. Metric 1.10 solicited the value in measuring the extent of competition achieved. Sixty-two percent of the respondents rated the measure either good (31%) or excellent (31%). The remaining respondents (38%) felt the measure was poor (15%), fair (15%) or not applicable (8%). Six respondents from DCMC elected not to rate the metric.

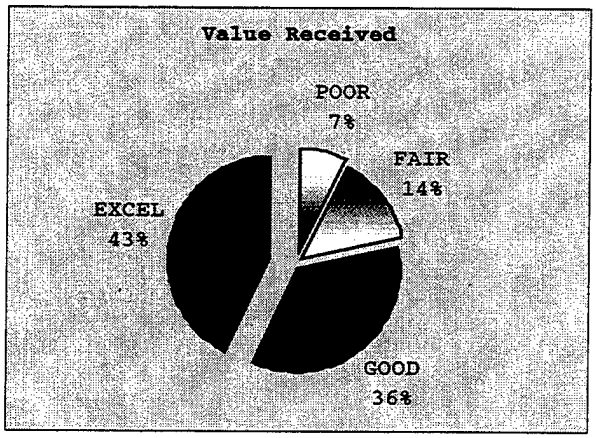
(10) Customer satisfaction. *Definition: The degree of customer satisfaction in the areas of timeliness, quality, and partnering.*



Metric 1.10 determined the value of monitoring OT customer service. The majority of respondents indicated customer satisfaction was a relevant measure. One hundred percent of the respondents rated the measure as fair (7%), good (27%) or excellent (66%). Zero

respondents rated the metric poor or not applicable, and three respondents from DCMC elected not to rate the metric.

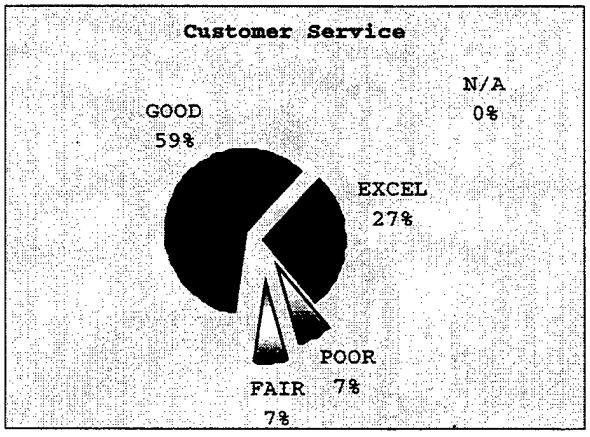
(11) Value received. *Definition: The degree of customer satisfaction in value received from contract staff.*



Metric 1.11 determined the respondents' perception of measuring value. The literature review reveals that value metrics are judgmental. They attempt to measure the abstract and are, therefore, subject to grader bias. Despite this weakness, seventy-nine percent of respondents rated the measure either good (36%) or excellent (43%). The remaining respondents (21%) felt the measure was either fair (14%) or poor (7%). Zero respondents rated the metric not applicable. Five respondents from DCMC elected not to rate the metric.

Because value measures are judgmental, their validity and reliability are subject to question. In the researcher's opinion, this weakness can be mitigated when both quantitative and qualitative measures are combined into a single index to better assess value.

(12) Customer service. *Definition: The degree of customer satisfaction with each procurement organization in the areas of timeliness, quality, and partnering.*



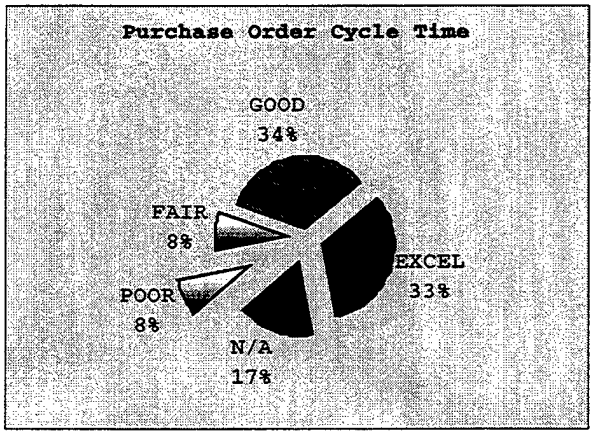
Customer service is also a judgmental measure. Comparing the responses to metrics 1.10 and 1.11 indicated that respondents support these types of measures. Eighty-six percent of the respondents rated the measure either good (59%) or excellent (27%). The remaining respondents (14%) felt the measure was either poor (7%) or fair (7%). Zero respondents rated the metric not

applicable, and three respondents from DCMC elected not to rate the metric.

Although some respondents commented that quantitative metrics should be developed, most preferred a "narrative" judgmental approach instead. Additional comments from respondents are paraphrased below:

> Subjective/intuitive evaluations can be more valuable than quantitative metrics in many cases.
>
> OT goals do not lend themselves to a strong use of metrics. Quantitative metrics are not going to tell the whole [OT] story.
>
> A general statement of the actual benefit the customer received should be all that is required.

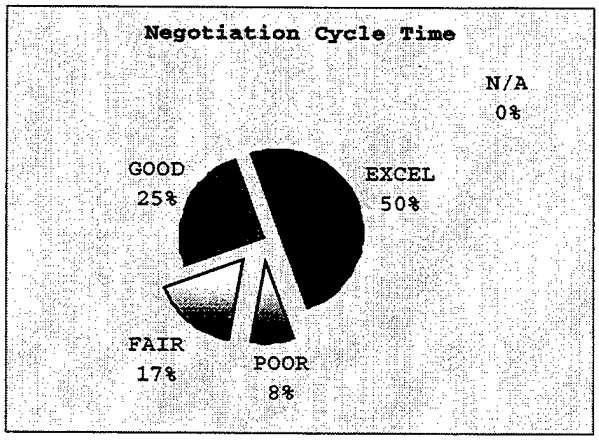
(13) Purchase order cycle time. *Definition: Timeliness of the award process from solicitation to award.*



The DODIG Audit Report 91-191 recommended that organizations should establish performance measures which include the time required to award an OT as opposed

to a contract. The following five metrics confirmed that respondents would likely support this recommendation. Seventy-five percent rated the measure as fair (8%), good (34%), or excellent (33%). The remaining respondents rated the metric poor (8%) or not applicable (17%). Six respondents from DCMC elected not to rate the metric.

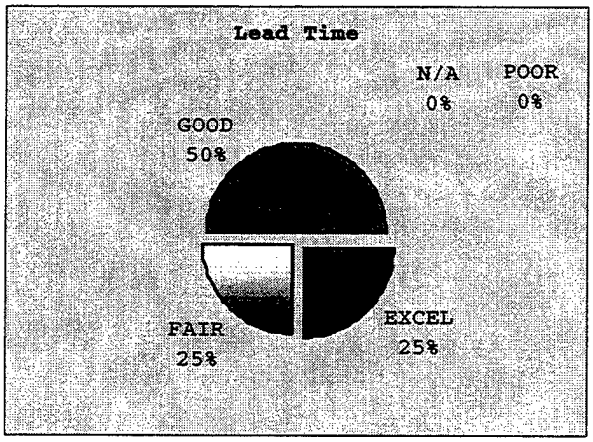
(14) Negotiation cycle time. *Definition: The average quantity of days required by the contract administration office to complete negotiation during the period. We have this metric to reduce the amount of time it takes to award a procurement action.*



Metric 1.14 determined whether respondents were concerned with the time required to negotiate an OT. Ninety-two percent of the respondents rated the measure fair (17%), good (25%) or excellent (50%). Eight percent rated the metric

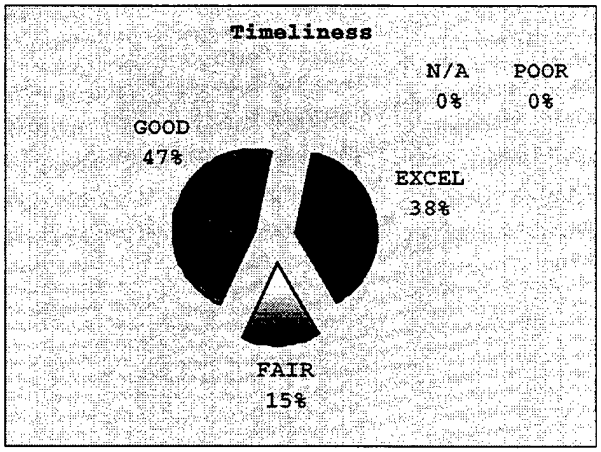
poor. Zero respondents rated the metric not applicable, and six respondents from DCMC elected not to rate the metric.

(15) Lead time. *Definition: Timeliness of the award process from solicitation to award.*



Lead-time differs from negotiation cycle time in that it captures the entire award process. This metric determined whether respondents were concerned with the time required to solicit, negotiate and award an OT. One hundred percent of the respondents rated the measure fair (25%), good (50%) or excellent (25%). Zero respondents rated the metric poor or not applicable. Six respondents from DCMC elected not to rate the metric.

(16) Timeliness. *Definition: Timeliness of the award process from solicitation to award.*

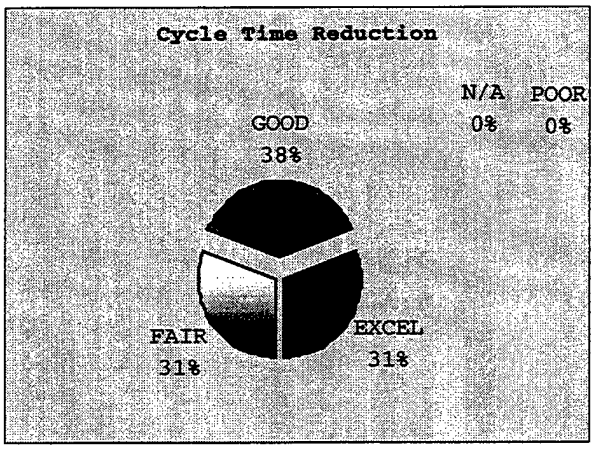


Timeliness and lead-time (Metric 1.15) are defined exactly the same, and responses for both metrics were consistent. One hundred percent of the respondents rated the measure fair (15%), good (47%) or excellent (38%). Zero respondents rated the metric poor or not applicable. Six respondents from DCMC elected not to rate the metric.

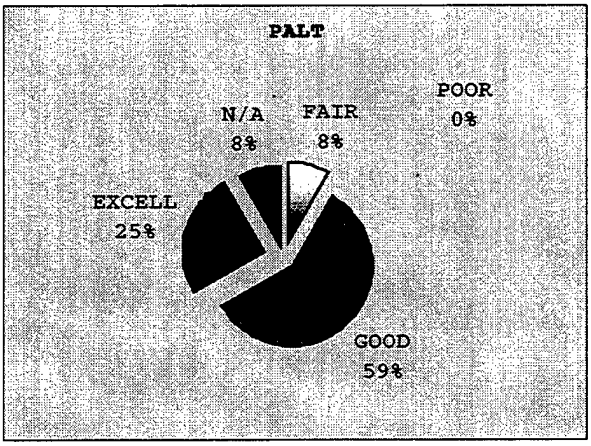
(17) Cycle time reduction. *Definition: Timeliness of the acquisition process from the beginning of concept exploration to completion of prototype.*

Metric 1.17 determined if respondents valued a metric that measured cycle time reduction from beginning of concept exploration to completing a prototype. One hundred percent of the respondents rated the measure fair

(31%), good (38%) or excellent (31%). Zero respondents rated the metric poor or not applicable, and five respondents from DCMC elected not to rate the metric.



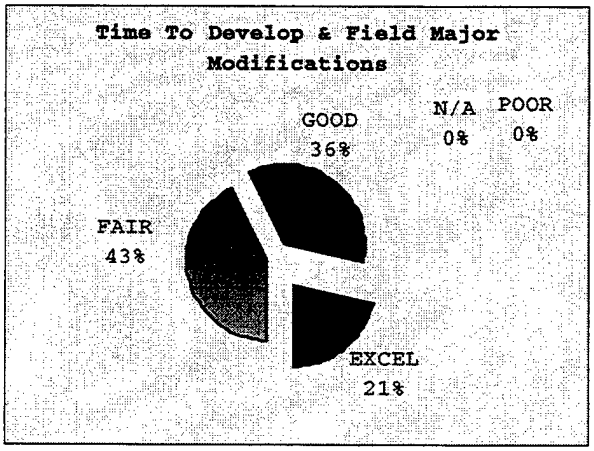
(18) Procurement administrative lead-time (PALT). *Definition: Timeliness of the award process from solicitation to award.*



Metric 1.18 determined the value of measuring Procurement Administration Lead Time (PALT). Like the previous metrics "timeliness" and "lead time,"

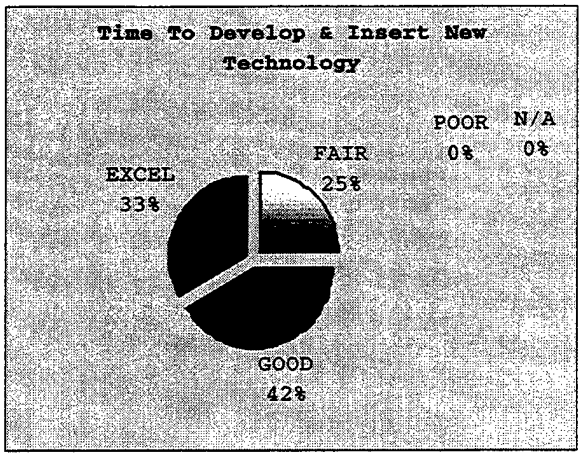
PALT measures the timeliness of the award process. Ninety-two percent of the respondents rated the measure fair (8%), good (59%) or excellent (25%). Eight percent rated the metric not applicable, and zero rated the metric poor. Six respondents from DCMC elected not to rate the metric.

(19) Time to develop and field weapon system modifications. *Definition: Not provided.*



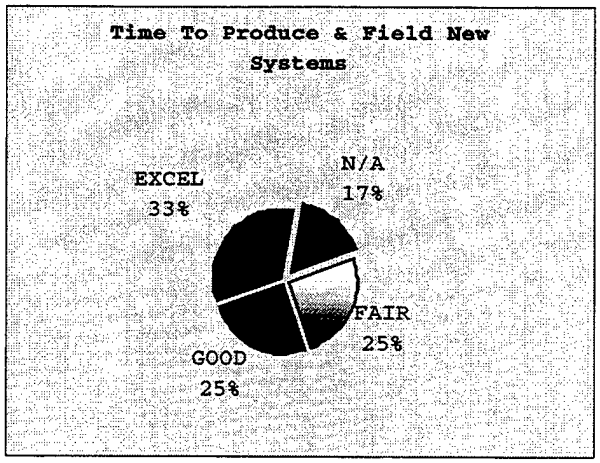
This metric determined whether respondents thought monitoring the time it takes to develop and field a major weapon system modification was relevant to OTs. One hundred percent of the respondents rated the measure fair (43%), good (36%) or excellent (21%). Zero respondents rated the metric poor or not applicable. Four respondents from DCMC elected not to rate the metric.

(20) Time to develop and insert new technology. *Definition: Not provided.*



This metric determined whether respondents thought measuring the time it takes to develop and insert new technology was appropriate. One hundred percent of the respondents rated the measure fair (25%), good (42%) or excellent (33%). Zero respondents rated the metric poor or not applicable, and six respondents from DCMC elected not to rate the metric.

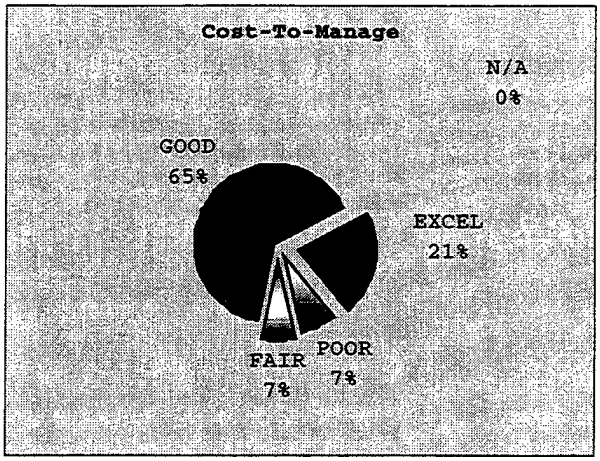
(21) Time to produce and field a major system. *Definition: Not provided.*



This metric determined whether respondents thought measuring the time it takes to produce and field a major system was appropriate. Eighty-three percent of the respondents rated the measure fair (25%), good (25%) or excellent (33%). Zero respondents rated the metric poor, and 17 percent rated it not applicable. Six respondents from DCMC elected not to rate the metric.

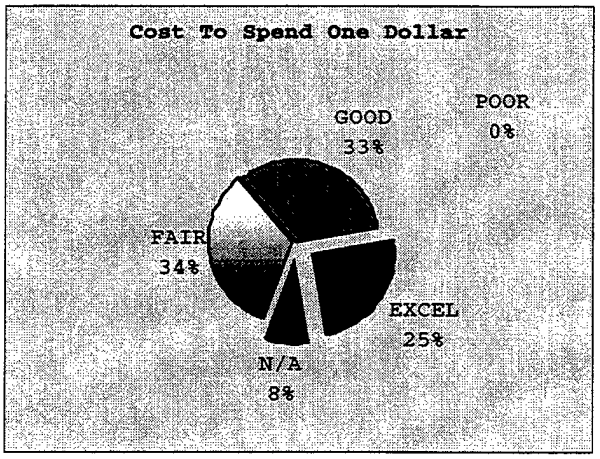
(22) Cost-to-manage. *Definition: Cost for each procurement organization to manage procurement activity.*

Metric 1.22 solicited the value of measuring costs associated with drafting and administering OTs. Eighty-six percent of the respondents



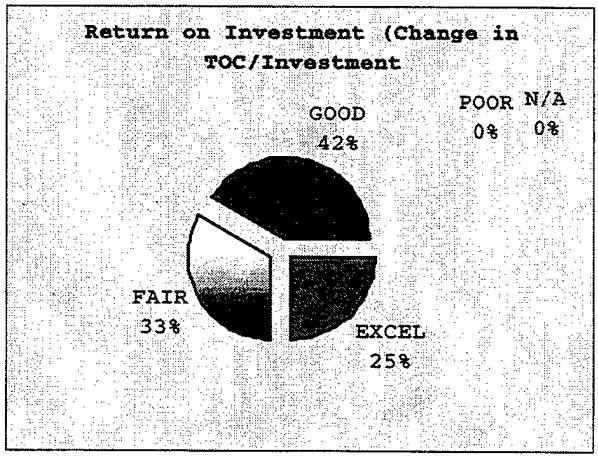
rated the metric either good (65%) or excellent (21%). The remaining respondents (14%) rated the metric fair (7%) or poor (7%). Five respondents from DCMC elected not to rate the metric.

(23) Cost to spend a dollar. *Definition: Procurement operating expense as a percent of award dollars.*



This metric is similar to cost-to-manage. Fifty-eight percent of the respondents rated the metric good (33%) or excellent (25%). The remaining respondents rated the metric fair (34%) or not applicable (8%). Zero respondents rated the metric poor, while six respondents from DCMC elected not to rate the metric. Comparing metrics 1.22 and 1.23 reveals that respondents gave a combined rating, good and excellent, to cost-to-manage (86%) that exceeded cost-to-spend-a-dollar (58%).

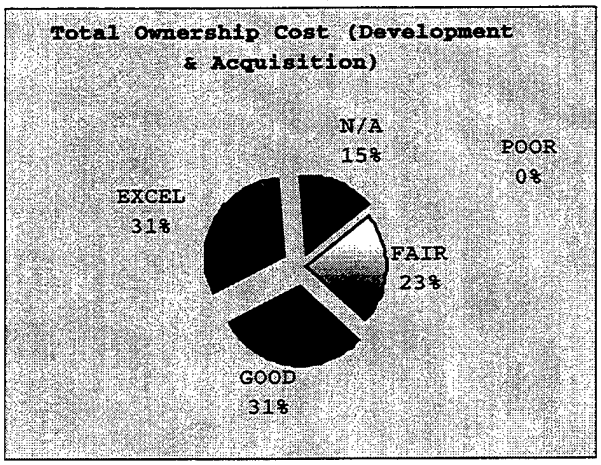
(24) Return on investment. *Definition: Change in Total Ownership Cost divided by investment.*



This metric determined whether respondents thought measuring Return on Investment (ROI) was appropriate. Sixty-seven percent of the respondents rated the measure either good (42%) or excellent (25%). Thirty-

three percent rated the metric fair, and zero rated the metric poor or not applicable. Six respondents from DCMC elected not to rate the metric.

(25) Total Ownership cost. *Definition: Not provided.*



This metric determined whether respondents thought measuring total ownership cost (TOC) was applicable to OTs. Sixty-two percent of the respondents rated the measure either good (31%) or excellent (31%). Twenty-three percent rated the metric fair and 15 percent not applicable. Zero respondents rated the metric poor. Six respondents from DCMC elected not to rate the metric.

b. Analysis

Table 5.2 summarizes the respondents' evaluation of the extent to which 25 standard contract management metrics are appropriate for measuring the use and value of Section 845 OTs. The table is organized by measurement category. Metrics are highlighted that received a combined quality rating greater than 70 percent, for *good and excellent*. Individual metrics that received a quality rating of 50 percent or better, for either *good or excellent*, are blocked.

Considering the responses summarized above led to the following conclusions: (1) thirteen metrics received a combined quality rating, of good and excellent, that exceeded 70 percent; (2) the thirteen metrics represent a balanced approach across all six measurement categories; and (3) customer satisfaction, customer service, cost-to-manage, and timeliness received the highest cumulative ratings.

METRIC	CAT	POOR	FAIR	GOOD	EXCEL	N/A
Awards and Modifications Issued	EFFECT	7%	13%	**47%**	**33%**	0%
Competition Goals	EFFECT	15%	15%	31%	31%	8%
Active Suppliers Per Purchasing Employee	EFFIC	29%	7%	14%	14%	36%
Workload And Staffing	EFFIC	7%	13%	**60%**	**20%**	0%
Reduce Total Ownership Costs (TOC)	FIN	0%	23%	31%	31%	15%
Return-On-Investment (ROI)	FIN	0%	33%	42%	25%	0%
Cost-To-Spend A Dollar	FIN	0%	33%	33%	25%	8%
Cost-To-Manage	FIN	7%	7%	**64%**	**21%**	0%
Solicitations Issued	PROD	33%	8%	25%	33%	0%
Contractors Assigned Prime Contracts	PROD	8%	17%	**42%**	**33%**	0%
New Contracts, Competitive/Non-Competitive	PROD	17%	17%	17%	42%	8%
New Financial Assistance Instruments	PROD	0%	8%	25%	33%	33%
Contract Awards	PROD	0%	29%	**29%**	**43%**	0%
Customer Satisfaction	QUAL	0%	7%	**27%**	**67%**	0%
Value Received	QUAL	7%	14%	**36%**	**43%**	0%
Customer Service	QUAL	7%	7%	**60%**	**27%**	0%
Time to Develop & Insert New Technology	TIME	0%	25%	**42%**	**33%**	0%
Time to Develop & Field Major System	TIME	0%	25%	25%	33%	17%
Time to Develop & Field Major Mods	TIME	0%	43%	36%	21%	0%
Purchase Order Cycle Time (Days)	TIME	8%	8%	33%	33%	17%
Negotiation Cycle Time	TIME	8%	17%	**25%**	**50%**	0%
Lead Time	TIME	0%	25%	**50%**	**25%**	0%
Timeliness	TIME	0%	15%	**46%**	**38%**	0%
Cycle Time Reduction	TIME	0%	31%	38%	31%	0%
PALT	TIME	0%	8%	**58%**	**25%**	8%

Table 5.2. Summary of metric ratings by measurement category. [Source: Developed by Researcher]

The literature review suggested that metrics can be identified to help management assess the value, and control the use, of Section 845 OTs. The respondents confirm this belief. Table 5.3 lists, by rank, the respondents' top 13 metrics. To qualify, metrics had to receive a combined quality rating, for *good and excellent*, that exceeded 70 percent.

For thirteen contract metrics, 70 percent of the respondents believe they are appropriate for managing Section 845 OTs. This fact is significant and indicates

that both quantitative and qualitative performance metrics are applicable to OTs.

Additionally, the research identified seven metrics having a combined quality rating of 80 percent or better. This indicates the respondents' willingness to support customer satisfaction, cost-to-manage, timeliness and workload performance metrics. Analysis suggests that there are two measurement categories considered most relevant to OTs: quality and timeliness.

Meanwhile, customer satisfaction and negotiation cycle time received the highest individual rating for excellent at 67 percent and 50 percent respectively. Similarly, the share of survey comments favoring intuitive/subjective measures, and raising concerns regarding the level of effort required to draft OTs support these findings.

METRIC	CAT	POOR	FAIR	GOOD	EXCEL	N/A	CUM RATING
Customer Satisfaction	QUAL	0%	7%	**27%**	**67%**	0%	**94%**
Customer Service	QUAL	7%	7%	**60%**	**27%**	0%	**87%**
Cost-To-Manage	FIN	7%	7%	**64%**	**21%**	0%	**85%**
Timeliness	TIME	0%	15%	**46%**	**38%**	0%	**84%**
PALT	TIME	0%	8%	**58%**	**25%**	8%	**83%**
Workload And Staffing	EFFIC	7%	13%	**60%**	**20%**	0%	**80%**
Awards & Modifications Issued	EFFEC	7%	13%	**47%**	**33%**	0%	**80%**
Value Received	QUAL	7%	14%	**36%**	**43%**	0%	79%
Negotiation Cycle Time	TIME	8%	17%	**25%**	**50%**	0%	75%
Reduce Time Insert New Tech	TIME	0%	25%	**42%**	**33%**	0%	75%
Lead Time	TIME	0%	25%	**50%**	**25%**	0%	75%
Contractors Assigned Prime K	PROD	8%	17%	**42%**	**33%**	0%	75%
Contract Awards	PROD	0%	29%	**29%**	**43%**	0%	72%

Table 5.3. Ranking of top 13 metrics that received a quality rating (good + excellent) above 70 percent. [Source: Developed by Researcher]

c. Response to Questions Two, Three, and Four

Questions two, three, and four asked the respondents to: Evaluate the following metrics as they apply to Section 845 OT. Indicate if the metric is both meaningful, measurable, relates to your organization's goals, and is economical to collect.

This series of questions solicited the respondents' opinions regarding OT metrics developed by the researcher. Respondents were provided the name of the metric, a description, and an explanation of the process to be measured. They then answered four compliance questions (YES/NO) and were encouraged to elaborate on any response.

(1) Question 2. *Metric name*: Section 845 Prototype Acquisition Cycle Time; *Description*: The average quantity of days required developing a prototype; *Explanation of the process to be measured*: Acquisition cycle time is computed in days. The cycle time is calculated by subtracting the Julian date BAA was issued from the Julian date prototype was completed. Average cycle time is calculated by adding the individual cycle times in the population and dividing by the number of Section 845 OTs in the population.

	YES	NO
Meaningful to organization	79%	21%
Relates to organization's goals	86%	14%
Data is measurable	87%	13%
Data is economical to collect	80%	20%

Figure 5.5. OT Acquisition Cycle Time, Compliance Rating. [Source: Developed by Researcher]

Respondents rated this metric favorably. (Figure 5.5). This is consistent with the results of metrics 1.20 (time to develop and insert new technology) and 1.21 (time to produce and field a major system). Many of the respondents stated that the time required to develop research and development prototypes would vary greatly, depending on the complexity of the system planned and the acquisition strategy. Over time, trend analysis may indicate that cycle time is reduced.

(2) Question 3. *Metric name*: Attracting non-traditional defense contractors; *Description*: The extent of non-traditional defense contractors attracted by Section 845 Prototype project; *Explanation of the process to be measured*: Volume of the number of contractors submitting bids (defense, non-defense, consortia members); number of non-defense lower-tier divisions/contractors under prime; number of prime and lower-tier contractors that achieved CMRR status.

	YES	NO
Meaningful to organization	88%	13%
Relates to organization's goals	88%	13%
Data is measurable	80%	20%
Data is economical to collect	67%	33%

Figure 5.6. Attracting Non-traditional Defense Firms, Compliance Ratings. [Source: Developed by Researcher]

Respondents rated this metric favorably. (Figure 5.6). This is consistent with the results of metric 1.10 (competition). Eighty-eight percent of respondents indicated that this metric was meaningful and related to their organization's goals. Eighty percent felt metric data were measurable; however, several respondents commented that the term "non-traditional" was ambiguous and must be better defined to accurately capture information for this metric.

(3) Question 4. *Metric name:* OTA cost avoidance; *Description:* Costs avoided resulting from relief of administrative burdens, conventional contract oversight, design/modification flexibility, cost sharing, etc. *Explanation of the process to be measured:* Calculate cost avoidance in current year dollars over a period not to exceed the life of the Section 845 OT. Cost avoidance is reported on a one-time basis; however, additional amounts may be reported when they are identified. Cost avoidance may be reported in work-hours.

	YES	NO
Meaningful to organization	100%	0%
Relates to organization's goals	100%	0%
Data is measurable	31%	69%
Data is economical to collect	25%	75%

Figure 5.7. OTA Cost Avoidance, Compliance Rating. [Source: Developed by Researcher]

Respondents rated this metric favorable (Figure 5.7). This is consistent with the results of metrics 1.22 (cost-to-manage) and 1.23 (cost-to-spend-a-dollar). One hundred percent of respondents indicated that this metric was meaningful and related to their organization's goals.

d. Response to Question Number Five

The fifth question was: From the list below, please identify, by ranking in order of importance, the most significant output of a Section 845 "Other Transactions."

Respondents were provided the following six selections to choose from:

1. Attract non-traditional defense prime and sub-contractors.
2. Provide flexibility in the design and development process.
3. Tap into commercial technology otherwise not available to DOD.
4. Reduce total ownership cost.

5. Shorten acquisition cycle time.

6. Provide relief from mandates, statutes, and regulations.

(1) Response and Analysis. The most significant output of Section 845 OTs was emphasized in the literature review and is presented above. Analysis suggests there are four outcomes that are most important to respondents: the ability to attract non-traditional defense firms, flexibility in the design and development process, tapping into commercial technology and relief from mandates, statutes and regulations. Specific trends are evident in figures 5.8, 5.9, and 5.10.

	Attract non-traditional	Design flexibility	Tap into Commercial technology	Reduce TOC	Reduce cycle time	Relief From FAR
1st	17%	22%	28%	0%	0%	33%
TOTAL	17%	22%	28%	0%	0%	33%

Figure 5.8. Most Significant Outcome; Respondents 1st choice. [Source: Developed by Researcher]

Figure 5.8 shows that respondents ranked relief from mandates statutes and regulations as the most significant output of an OT (33%). Tapping into commercial technology (28%) was ranked second, and flexibility in the design and development process was third (22%). Reducing total ownership costs and shortening the acquisition cycle time ranked lowest.

	Attract non-traditional	Design Flexibility	Tap into Commercial technology	Reduce TOC	Reduce cycle time	Relief From FAR
1st	17%	22%	28%	0%	0%	33%
2nd	28%	22%	33%	6%	6%	6%
TOTAL	45%	44%	61%	6%	6%	39%

Figure 5.9. Most Significant Outcome; Respondents 1st and 2nd choices. [Source: Developed by Researcher]

When the respondents' first and second choices were analyzed, the results shifted slightly. Figure 5.9 shows that respondents ranked the ability to tap into commercial technology as the most important output (61%). Attracting non-traditional defense firms (45%) was ranked slightly above flexibility in the design and development process (44%). Reducing total ownership costs and shortening the acquisition cycle time were again ranked lowest.

	Attract Non-traditional	Design flexibility	Tap into Commercial technology	Reduce TOC	Reduce Cycle time	Relief From FAR
1st	17%	22%	28%	0%	0%	33%
2nd	28%	22%	33%	6%	6%	6%
3rd	17%	28%	11%	6%	17%	22%
TOTAL	62%	72%	72%	12%	23%	61%

Figure 5.10. Most Significant Outcome; Respondents 1st, 2nd and 3rd choices. [Source: Developed by Researcher]

Figure 5.10 shows that respondents ranked the ability to tap into commercial technology (72%) and flexibility in the design and development process (72%) as

equally important outputs (tie for first) when first, second and third choices were considered. Attracting non-traditional defense firms (62%) and relief from mandates statues and regulations (61%) were ranked closely at third and fourth.

When the first, second and third choices were analyzed, the results clearly show that reducing total ownership costs (TOC) and shortening the acquisition cycle time are considered the least significant outputs of an OT. The respondents' low perception of TOC is consistent with results found in metric 1.25. However, the respondents' low perception of reducing acquisition cycle time contradicted findings revealed in metrics 1.17 (cycle time reduction) and 1.20 (time to develop and insert new technology).

e. Response to Question Number Six

The sixth question was: Identify, by ranking in order of importance, the most critical dimension of a Section 845 "Other Transactions."

Respondents were provided the following five selections to choose from:

1. Freedom to negotiate intellectual property rights terms and conditions.

2. Provisions for proof of concept and prototype development prior to entering engineering manufacturing and design phase.

3. Minimal DCAA involvement.

4. Competing firms are not required to comply with Truth in Negotiations Act (TINA) or Cost Accounting Standards (CAS).

5. Provisions for cost and data sharing arrangements between Government and contractor.

(1) Response and Analysis. According to the literature review, an organization must first identify the most significant output. Second, it must identify the critical dimensions of performance for each output. Critical dimensions should be derived from the needs of the customers who receive the output. This question was designed to determine what the respondent's believed were the most critical dimensions of a Section 845 OT.

The most critical dimension of a Section 845 OT was emphasized in the literature review. Analysis suggests that three critical dimensions are most important to respondents: freedom to negotiate IPR and terms and conditions, proof of concept and prototype, cost and data sharing arrangements. Specific trends are evident in figures 5.11, 5.12, and 5.13.

	Freedom to Negotiate	Proof of Prototype	Minimal DCAA	No TINA & CAS	Cost & Data sharing
1st	28%	28%	0%	0%	44%
TOTAL	28%	28%	0%	0%	44%

Figure 5.11. Critical Dimensions of an OT; Respondents 1st choice. [Source: Developed by Researcher]

Figure 5.11 shows that respondents ranked cost and data sharing as the most critical dimension of an OT (44%). Freedom to negotiate (28%) and proof of prototype (28%) tied for the second position. Minimal DCAA involvement and competing firms not having to comply with TINA or CAS ranked lowest.

	Freedom to Negotiate	Proof of Prototype	Minimal DCAA	No TINA & CAS	Cost & Data sharing
1st	28%	28%	0%	0%	44%
2nd	33%	22%	0%	33%	11%
TOTAL	61%	50%	0%	33%	55%

Figure 5.12. Critical Dimensions of an OT; Respondents 1st and 2nd choices. [Source: Developed by Researcher]

When the respondents' first and second choices were analyzed, the results shifted. Figure 5.11 show that respondents ranked the freedom to negotiate as the most critical dimension (61%). Cost and data sharing (55%) was ranked second, and proof of prototype was third (50%). Minimal DCAA involvement and competing firms not having to comply with TINA or CAS were again ranked lowest.

	Freedom to Negotiate	Proof of Prototype	Minimal DCAA	No TINA & CAS	Cost & Data sharing
1st	28%	28%	0%	0%	44%
2nd	33%	22%	0%	33%	11%
3rd	17%	6%	28%	22%	28%
	78%	56%	28%	55%	83%

Figure 5.13. Critical Dimensions of an OT; Respondents 1st, 2nd and 3rd choices. [Source: Developed by Researcher]

When the respondents' first, second and third choices were analyzed, the results clearly show the least significant critical dimension to be minimal DCAA involvement. Figure 5.13 show respondents ranked cost and data sharing as the most significant critical dimension of an OT (83%). Second in importance was freedom to negotiate IPR and terms and conditions (78%). Proof of prototype (56%) and firms not having to comply with TINA or CAS (55%) were essentially tied at third.

f. *Responses to Question Number Seven*

The seventh survey question was: To what extent have Section 845 "Other Transactions" reduced the time required to develop and insert new technologies?

This question determined if respondents believe that Section 845 OTs reduce the time required to develop and insert new technology. Respondents were provided with the following six selections:

1. OTs significantly reduce the time required (>50%).

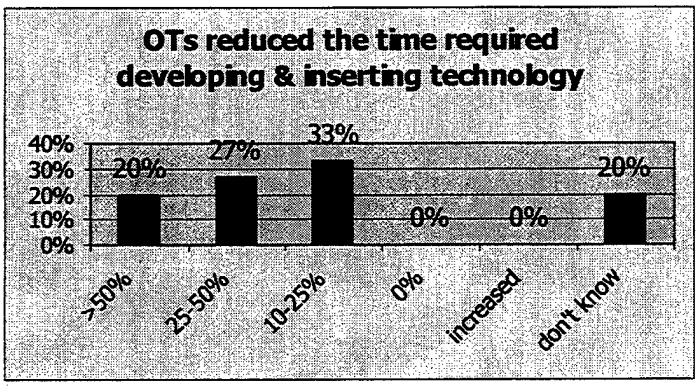
2. OTs reduce the time required (25-50%).

3. OTs somewhat reduce the time required (10-25%).

4. OTs do not reduce the time required to insert new technology.

5. OTs lengthen the time required to insert new technology.

6. Do not know.



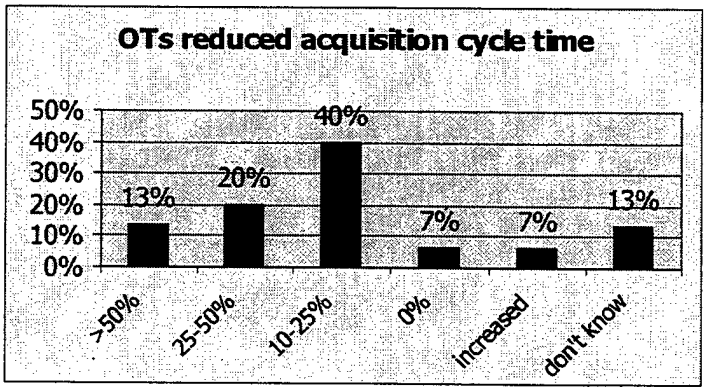
(1) Response and analysis. Eighty percent of the respondents quantified their answer, while 20% did not. Twenty percent of the respondents felt that Section 845 OTs contributed to at least a 50-percent reduction in the amount of time required to develop and insert new technology. Other respondents believed that they had contributed to a ten- to fifty-percent reduction in the time required to develop and insert new technology. Three DCMC respondents elected not to answer this question for lack of data.

g. Response to Question Number Eight

Question number eight was: To what extent have Section 845 "Other Transactions" reduced acquisition cycle time?

This question determined if respondents felt Section 845 OTs reduced acquisition cycle times. Respondents were provided the following five selections:

1. OTs significantly reduced acquisition cycle time (>50%).
2. OTs reduced acquisition cycle time (25-50%).
3. OTs somewhat reduced acquisition cycle time (10-25%).
4. OTs have not reduced acquisition cycle time.
5. OTs have lengthened acquisition cycle time.



(1) Response and Analysis. Seventy-three percent of the respondents felt that Section 845 OTs had reduced acquisition cycle time. Seven percent of the respondents indicated that OTs had increased acquisition cycle time, and 13 percent did not know. Three DCMC

respondents elected not answer this question for lack of data.

The majority of the respondents indicated that OTs had contributed to between a ten- and twenty-five percent reduction in time. The results confirmed the DOD IPT's preliminary findings: the Services are shortening the prototype cycle time [Ref. 1]. However, results from question five appear to imply respondents considered this to be one of the least significant OT outputs.

In the researcher's opinion, reducing acquisition cycle time is critical to both cost and performance. Under the traditional approach, using a standard FAR/DFAR contract, Phases 0 and I of a major defense acquisition program (MDAP) may require in excess of five to nine years. As the literature review revealed, Government-imposed mandates, statutes and regulations often discourage high-technology firms from bidding research and development (R&D) projects. Their primary concerns involve intellectual property rights (IPR), cumbersome business practices, socioeconomic goals, strict reporting standards, and developmental test and evaluation requirements. The OTA approach frees commercial firms from this realm and enables them to produce uninhibited material solutions

quickly. This flexibility also enables contracting officers to negotiate IPR and address other issues; and it encourages firms to produce prototypes more quickly than the traditional approach allows, due in part to the incentive of taking the technology to the commercial marketplace. In the researcher's opinion, OTA is an enabler that helps to shorten the early stages of the acquisition cycle.

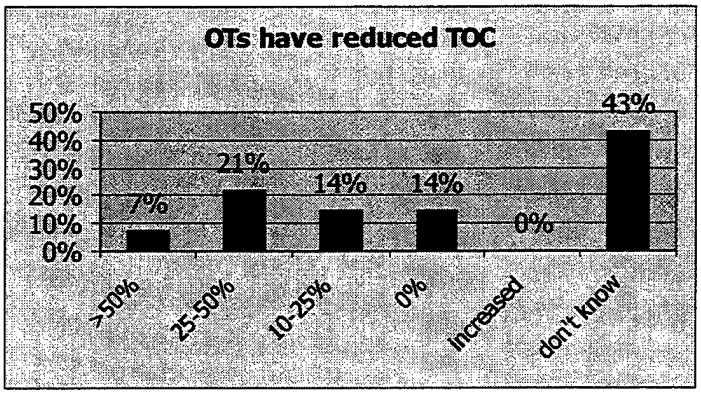
h. Response to Question Number Nine

The ninth survey question was: To what extent have Section 845 "Other Transactions" reduced total ownership cost?

This question determined if respondents felt Section 845 OTs contribute to a reduction in total ownership cost (TOC). Respondents were provided the following six selections:

1. OTs significantly reduce total ownership cost (>50%).
2. OTs reduce total ownership cost (25-50%).
3. OTs somewhat reduce total ownership cost (10-25%).
4. OTs do not reduce total ownership cost.
5. OTs increase total ownership cost.

6. Do not know.



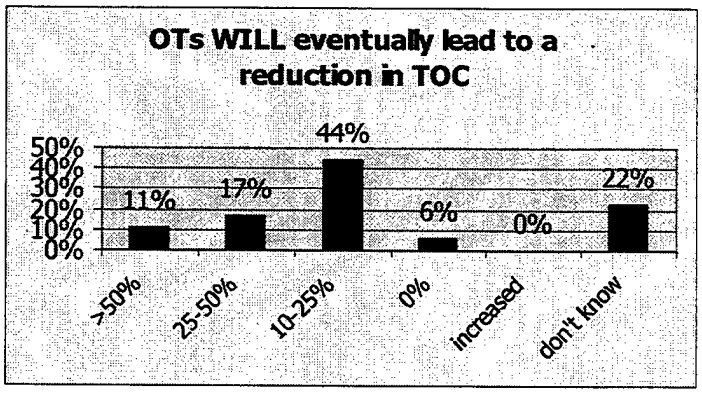
(1) Response and Analysis. Results were mixed. Forty-two percent of the respondents felt that Section 845 OTs contributed to a reduction in TOC. Forty-three percent of the respondents indicated they did not know if OTs had decreased TOC. Three DCMC respondents elected not to answer this question for lack of data. Although the results provide some indication, they were inconclusive. Many respondents interviewed by telephone noted that several OTs were still in effect and had not been completed or closed out. Results from question five show respondents considered TOC to be one of the least significant outputs of an OT.

i. Response to Question Number Ten

The tenth question was: To what extent do you believe Section 845 "Other Transactions" WILL reduce total ownership cost over the long run?

This question determined if respondents felt Section 845 OTs will eventually reduce total ownership cost (TOC). Respondents were provided the following six selections:

1. OTs will significantly reduce total ownership cost (>50%).
2. OTs will reduce total ownership cost (25-50%).
3. OTs will somewhat reduce total ownership cost (10-25%).
4. OTs will not reduce total ownership cost.
5. OTs will increase total ownership cost.
6. Do not know.



(1) Response and Analysis. The majority of respondents, 72 percent, believe Section 845 OTs will eventually reduce TOC. Six percent of the respondent were not as optimistic, while twenty-two percent were unsure. All respondents answered this question.

The primary goal of many acquisition strategies, as articulated by the DODD 5000 series, is to minimize the time and cost required to satisfy an identified, validated need, consistent with common sense and sound business practices. According to the Defense Science Board's 1996 Task Force on Defense Acquisition Reform, the first two phases of a Major Defense Acquisition Program take an average of five to nine years to complete. These phases, which account for three to fifteen percent of total cost, are most important because they drive engineering and design, which, in turn, drives life cycle costs. When properly employed as part of the acquisition strategy for a major acquisition program, Section 845 OTs enable program offices to gain competitive advantage in terms of technology, design flexibility, scheduling and cost.

It is difficult to measure reductions in total ownership cost directly related to OTs. However, this should not discourage acquisition professionals from striving to develop meaningful and accurate measures aimed at capturing this important performance goal.

j. Response to Question Number Eleven

Question number eleven was: From your perspective, should activities that enter into Section 845

OTs be required to measure the use and value of those instruments?

The purpose of this question was to determine the barriers, according to the respondents, to measuring OTs. Two barriers were commonly mentioned:

1. The perception that requirements to measure defeat the purpose of commercial streamlining.

2. Collecting data, measuring performance, and reporting metrics are burdensome.

Representative comments about requirements to measure the use and value of OTs are paraphrased below:

> The genesis and nature of OTA is to reduce burdensome requirements in an effort to streamline the acquisition process. Placing metric burdens other than those called for by the program manager and contracting officer reduces the attractiveness of such an instrument.
>
> The value of an OT is the commercial nature of the agreement. Any requirements to measure defeat the purpose of commercial streaming.
>
> As soon as you start adding administrative requirements for measuring and collecting metrics, you cancel the benefit of the OTs. The Section 845 was developed to avoid administrative burdens on the government and contractor.
>
> We have been burdened with many requests for reports and data concerning OTs. The administration time required for measurement adds to our 8-hour workday.

Based on the literature review, the researcher anticipated that the respondents would be averse to measuring OTs. Research found that sixty percent of the respondents believe activities, which enter into Section 845 OTs, should be required to measure the use and value of those instruments. Additional comments in favor of OT metrics were:

> Yes, we should be required to measure OT performance. Section 845 OTs are still relatively new and not widely used. Therefore, this information is important to weigh the pros and cons of using OTA.
>
> Yes, however we should be cautious of metric approaches that are overly structured. Each individual OT will have it's own story and will probably not conform to a standard metric format.
>
> In my mind, the value of Section 845 OT is attracting non-standard companies. Our focus should be on the success of doing that.
>
> I am in favor of OT metrics. If OTs don't produce a value to the organization, by opening the competitive boundaries under which contractors compete, then why do them?
>
> Yes, activities should be required to measure OT performance. We should be using OTs to attract new companies and new technologies, as well as to enter into new partnerships with existing DOD contractors that we couldn't get access to by using a traditional FAR contract. Tracking this type of information is relevant.
>
> It's a good idea to measure their [OT's] performance. However, it is difficult to define their use and value, and hard to prove if OT is achieving goals and objectives.

(1) Analysis. The literature review performed earlier in this research, along with analysis conducted in previous chapters, indicated that the general level of support for OT metrics within DOD was low. Approximately 40 percent of this question's respondents confirmed that finding. Their responses suggest two barriers against OT metrics: the perceptions that metric requirement defeats the purpose of commercial streamlining and that metrics are a burden to collect.

The researcher believes the tendency for these barriers to exist stems from two sources: a lack of understanding within DOD of performance metrics, and the plethora of contract metrics used to measure the same bottom-line-oriented performance that DOD has measured for years.

In the researcher's opinion, the perception that metric requirements defeat the purpose of commercial streamlining indicates a lack of understanding of both performance measures and acquisition reform initiatives. Common purposes for measuring performance include assessing management, evaluating policy and value-added initiatives, monitoring risk, and determining whether the organization is being effective and efficient. The researcher believes that performance measures do not

negatively impact commercial streamlining reform efforts. In fact, if properly developed, they can be used to monitor the success of reform initiatives. For example, measuring the success of OTA to attract non-traditional defense firms could be used to monitor, arguably, one of the authority's prime objectives.

The respondents are correct; metrics can be burdensome to collect and report. Survey results presented in Chapter IV identified a sample of 241 metrics used to measure the performance of procurement organizations. DOD organizations have used this abundance of contract metrics to measure the same bottom-line-oriented performance for years. Chapter III listed several attributes metrics should possess in order to be effective. Metrics should also be directly linked to organizational output and critical dimensions of performance to be meaningful and accepted. Many DOD performance metrics lack these attributes and are not directly linked to key business drivers. Therefore, it is not surprising that many in the acquisition community perceive metrics as burdensome.

However, a majority of respondents indicated that establishing OT performance measures should be required. This is a significant finding and supports

the need for metrics. Although most acquisition professionals support OT metrics, they favor a sensible approach—one that is not overly structured.

k. Response to Question Number Twelve

Question number twelve was: To what extent can metrics be used to provide insight into whether Section 845 OTs are better, faster, and cheaper methods of conducting business?

This question solicited the respondents' opinions regarding the extent to which OT metrics provide insight into whether Section 845 OTs are better, faster, and cheaper than standard FAR type contracts. Representative comments are paraphrased below:

> Metrics are definitely important in determining whether Section 845 OTs are a better, faster, and cheaper method of conducting business. Cost performance and cycle time measures could be used to determine the effect of OT on acquisition cycle and costs to the government.

> Those metrics which are easily collected and reflect accurately the cost savings, lead time reduction, etc. can be used, but business methods not easily captured with metrics should not be brought into metric evaluation. Subjective/intuitive evaluations can be more valuable then metrics in many cases.

> OT metrics should focus on cycle time and be able to assess their cost-to-manage vs. traditional contents.

> OTs are faster because they allow you to work problems outside the box [FAR/DFARS]. Metrics could be used to monitor this information.

Other, less positive, responses are presented below:

> Metrics can obviously be used to measure these elements. However, extreme caution should be used in developing OT metrics. One very basic concept of OTs is to reduce burdensome requirements. So, by developing these metrics, we impact that basic premise.
>
> Keep OT metrics light. Too much statistical analysis of OT vs. FAR contracts is probably unhealthy for both types.
>
> OT metrics should be used to assess the successfulness of OSD/ASN reform initiatives. They [OT metrics] should not be used to micro manage program offices.
>
> Metrics in the OT environment make me nervous. In general, metrics have a way of mystically growing to dominate a process.

(1) Analysis. The responses regarding whether metrics can be used to indicate if OTs are better, faster, and cheaper are mixed. Many respondents characterize OT metrics as promising and potentially useful. This characterization supports earlier findings that identified 13 standard contract metrics, which received a combined quality rating of 70 percent, applicable to OTs. This indicates that metrics are appropriate and relevant to measuring OTs. Other

respondents feel metrics would not yield meaningful information and would burden the acquisition workforce.

3. A Core Set of Metrics Applicable to Section 845 OTs

The study's second survey had two objectives. First, to determine the extent to which metrics used to manage standard contract performances are appropriate to manage Section 845 OTs. Table 5.2 above summarized the research findings applicable to this question. The second objective was to determine if new metrics can be developed which are appropriate for measuring the use and value of OTs.

The researcher recommends four possible measures that may serve as a core set of metrics applicable to Section 845 OTs. They are, attracting non-traditional defense firms, prototype acquisition cycle time, customer satisfaction and timeliness. Definitions of the metrics are provided in questions 3, 2, 1.9 and 1.17 respectively.

The researcher considers the first two metrics, attracting non-traditional defense firms, and prototype acquisition cycle time, as organizational measures. These measures are aimed at upper echelon organizations, such as ASN (RD&A). These metrics capture information directly

relevant to ASN (RD&A)'s key business process goals for reducing acquisition cycle time and enhancing the integration of civilian and military buying organizations. Metric information could be collected by either the DD Form 2759 Report of Other Transactions for Prototype Projects or it's Data Element Narrative.

Although reducing prototype acquisition cycle time was not considered a significant outcome when compared to others, 86 percent of respondents felt the measure related to their organization's goals, 87 percent indicated the metric data was measurable and 80 percent felt it was economical to collect. In fact, a similar metric "reducing time required to insert new technology" received a combined quality rating of 75 percent and was ranked ninth by respondents. According to the literature review conducted in Chapter III, this metric possesses the attributes of a successful measure and appears to be a useful performance indicator for one of the prime objectives of OTA- the ability to insert and develop new technology into a deliverable prototype.

The researcher also recommends attracting non-traditional defense firms as a core OT metric. Respondents ranked attracting non-traditional defense firms as the second most significant output of an OT, behind the ability

to tap into commercial technology otherwise unavailable to DOD. Eighty-eight percent of respondents' felt the measure was meaningful and indicated it related to their organization's goals, 80 percent claimed the metric data was measurable and 67 percent felt it was economical to collect. Although the metric possesses the attributes of a successful measure, the term non-traditional defense firm would need to be defined in order to make the metric both valid and reliable.

While the previous metrics are organizational measures, that serve the needs of the upper management echelon, the researcher also recommends two process metrics applicable to buying organizations: customer satisfaction and timeliness.

The most highly rated standard contract metric applicable to OTs was customer satisfaction. This metric received a combined quality rating of 94 percent and was ranked first by respondents. Respondents were not given the choice to select customer service as a significant outcome. However, they rated the flexibility OT provides the program office in the design and development process, as the most significant OT output; along with OTs ability to tap into commercial technology otherwise unavailable. In the researcher's opinion, both these outputs are

directly relevant to a program office's perception of customer satisfaction.

Additionally, this metric is closely aligned with the respondent's evaluation of the critical OT dimensions. Specifically, the ability to share data and negotiate key terms and conditions. Although customer satisfaction is a judgmental measure and subject to bias, many respondents indicated willingness to report intuitive style evaluations, rather than quantitative measures.

Another core metric the researcher recommends monitoring is the timeliness of the OT procurement process. This metric was ranked fourth by respondents and received a combined quality rating of 84 percent. Table 5.14 lists the researcher's core set of metrics applicable to Section 845 OTs.

CORE METRICS APPLICABLE TO SECTION 845 OTs	Measurement Category	Quality Rating
Attracting Non-Traditional Defense Firms	EFFECTIVENESS	NA
Section 845 Prototype Acquisition Cycle Time	TIMELINESS	NA
Timeliness of OT Award Process	TIMELINESS	84%
Customer Satisfaction	QUALITY	94%

Table 5.14. Core OT Metrics. [Source: Developed by Researcher]

D. SUMMARY

This chapter provided a summary analysis of the 241 standard contract metrics assigned to the six performance categories. The first part of the analysis described the

researcher's metric selection criteria and problems encountered in its application. Next, the researcher analyzed the 25 metrics subjectively determined to be most relevant to measuring OTs. The results were then used as a basis for the study's second survey.

Part two of the chapter presented the methodology used in the second survey and provided an analysis of the results. This analysis determined the extent to which standard contract metrics are appropriate for managing Section 845 OTs, and identified a core set of metrics to measure their use and value.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. INTRODUCTION

This chapter will present conclusions and recommendations based on the research, answer the primary and subsidiary research questions, and suggest areas for further research.

B. CONCLUSIONS

Several conclusions can be drawn from the research conducted in this study. First, survey one identified 241 contract management metrics used to measure the performance of 12 procurement organizations. Results indicate that organizations measure similar procurement processes; however, fewer than ten percent of the metrics identified shared the same title. Additionally, respondents confirmed that their organizations were not using metrics to measure the performance of OTs.

Second, the majority of respondents (70%) were unable to provide a formal metric [contract] listing. As explained in Chapter IV, Organizations were expected to provide a metric listing that identified metrics by measurement category, title, definition, objective, data source, computation method and frequency of measure. The

absence of standardization and metric classification presented a challenge when identifying the metrics most relevant to OTs. By applying Training Resources and Data Exchange's (TRADE) classification scheme to the base population of contract metrics, the researcher was able to organize metrics by measurement category (effectiveness, efficiency, quality, timeliness, productivity and financial). TRADE's classification scheme, along with the metric selection criteria detailed in Chapter V, enabled the researcher to subjectively determine the 25 metrics most relevant to OTs.

Third, of the 25 standard contract metrics subjectively determined to be most relevant to OTs, seven received a combined quality rating, for good and excellent, which exceeded 80 percent. Chapter V showed that the metrics considered the most appropriate for measuring OTs are customer satisfaction, customer service, cost-to-manage and timeliness.

Fourth, as detailed in Chapter V, the most significant output of a Section 845 OT was blurred at the first, second and third levels. Respondents considered Section 845 OT's most significant outputs to be its ability to tap into commercial technology, to attract non-traditional defense firms and to provide flexibility in the design/development

process. As Figure 5.9 shows, respondents judged the least significant output of an OT to be its ability to reduce total ownership costs (TOC). Respondents also indicated that OT's most critical dimensions are its cost and data sharing attributes.

Fifth, the majority of respondents felt that OTs contributed to at least a ten-percent reduction in the time required to develop and insert new technology, and to a significant reduction in acquisition cycle time.

Sixth, a slight majority of respondents (60%) favored establishing Section 845 OT performance measures; however, most were against taking an overly structured approach. As Chapter V explained, many respondents characterized OT metrics as promising and potentially useful; however, results were mixed as to whether organizations should be *required* to measure their use and value.

C. RECOMMENDATIONS

This study has provided information about standard contract performance metrics to determine the extent to which metrics are appropriate for managing OTs. Several recommendations draw on this information.

First, the acquisition and contracting community must be encouraged to measure performance. This would support

better management decision-making, thus improving outcomes. Organizations should concentrate metrics on key performance drivers that are meaningful, that relate to the organization's goals, and that are simple to understand, clearly defined and economical to collect. Ideally, the maximum number of metrics any organization should use is 20.

Organizations should maintain a command list of contract metrics complete with title, definition, classification, measurement objective, data source, computation methodology, and frequency of measure. This practice would assist acquisition professionals in establishing effective metrics focused on key business drivers. It also would enhance an organization's understanding of its critical dimensions and important outputs.

The second recommendation is that organizations should place a greater emphasis on developing Section 845 OT metrics. As in the Department of Defense (DOD) Integrated Product Team's preliminary findings and recommendations from the Office of the Inspector General, DOD (DODIG) Audit Report, activities that enter into Section 845 OTs should develop and employ metrics that measure the use and value of OTs. Survey results suggest that respondents are

willing to support standard contract metrics, such as customer satisfaction, workload performance, cost-to-manage and timeliness of the award process. The researcher believes that Section 845 OT metrics should focus on monitoring organizational goals at the Secretariat level. Two of these goals, reducing the time required to insert new technology and attracting non-traditional defense firms to participate in DOD R&D projects, are the primary objectives of other transaction authority (OTA). The survey respondents appeared willing to support organizational metrics aimed at monitoring acquisition cycle time and attracting non-traditional defense firms.

Finally, the researcher recommends establishing four measures to serve as a core set of metrics applicable to all Section 845 OTs: attracting non-traditional defense firms; monitoring prototype acquisition cycle time; customer satisfaction; and timeliness of the award process. Such metrics would provide information that could lead to a better understanding of the use and value of Section 845 OTs.

D. RESEARCH QUESTIONS

This section provides answers to the research questions posed in Chapter I. The primary research question this thesis sought to answer was:

1. To what extent are metrics used to measure standard contractual transactions appropriate to manage Section 845 "Other Transactions?"

The study suggests that 13 of 241 metrics (5%) used to manage standard contractual transactions are appropriate for managing Section 845 OTs. The data analysis, presented in Chapter V, identifies the metrics by title, performance category and level of acceptance.

Subsidiary research questions included:

2. What are Other Transactions, and how are they distinguished from standard contractual transactions?

In the context of the Federal Acquisition Regulations (FAR), OTs are not contracts, cooperative agreements or grants. Rather, they are funding instruments between Government and commercial firms or consortiums. OTs are used to carry out basic, applied, advanced research and prototype projects. OTs are different from standard contractual transactions because they are exempt from many mandates, statutes and regulations; this provides negotiators the flexibility to craft commercial-like

agreements that can address a broad spectrum of issues specific to individual program needs.

3. What metrics are commonly used to manage standard contractual transactions?

The summary analysis of the first survey, presented in Chapter IV, identified 241 standard contract metrics used by 12 buying organizations (Figure 4.2). Appendix A lists contract metrics by organization.

The absence of standardization and metric classification in the first survey prompted the researcher to classify the metrics into six performance measurement categories. These categories were effectiveness, efficiency, quality, timeliness, productivity and financial. Analysis of the classification results indicated the metrics were fairly evenly distributed across all six measurement categories (Figure 4.3).

4. To what extent are these metrics suitable for managing Other Transactions and Section 845 Prototype Transactions?

Based on criteria established in this research, 25 of 241 standard contract metrics were subjectively determined to be suitable for managing Section 845 OTs. Furthermore, the study showed that respondents rated 13 of 25 metrics to be most appropriate for managing Section 845 OTs. Table

5.3 lists, by rank, the respondents' top 13 metrics. To qualify, metrics had to receive a combined quality rating, for good and excellent, that exceeded 70 percent. The top 13 metrics are both qualitative and quantitative measures representing all six measurement categories.

5. Can a core set of metrics, common to all Section 845 Other Transactions, be developed?

The study suggested that four performance measures could serve as a core set of metrics common to all Section 845 OTs: attracting non-traditional defense firms; monitoring prototype acquisition cycle time; customer satisfaction; and timeliness of the award process. This suggestion was based on analysis presented in Chapter V.

6. What are the advantages of developing metrics for managing Section 845 Other Transactions and what are the barriers to implementing them?

This study suggested that metrics can assist management in assessing the value, and controlling the use, of Section 845 OTs. First, metrics could evaluate whether OTs are meeting value-added objectives such as attracting non-traditional defense firms, tapping into commercial technology or reducing prototype acquisition cycle time. Second, buying organizations could implement timeliness and customer satisfaction metrics to monitor how well the award

process was functioning. This could also identify OT performance disparities that should be analyzed and eliminated.

The study suggested that two barriers exist when implementing OT metrics. They are the perception by some that measurement requirements defeat the purpose of commercial streamlining and that metrics are a burden to collect. The researcher suggested in Chapter V that the tendency for these barriers to exist stems from two sources: a lack of understanding within DOD of performance metrics, and the plethora of meaningless contract metrics used to measure the same bottom-line performance that DOD has measured for the past twenty years.

The implementation of OT performance measures should involve as many cognizant employees as possible to stimulate ideas and reinforce the notion that performance measurement is a team effort requiring buy-in from all involved in order to succeed.

E. RECOMMENDATIONS FOR FURTHER RESEARCH

This study focused on developing Section 845 OT metrics. The researcher has identified three areas in which further research would be useful. The first recommendation is to conduct a comparative analysis of

buying organizations' contract metrics. Are organizational goals and objectives linked to contract performance metrics?

This study revealed, intuitively, that OTs have been successful in attracting non-traditional sources of supply, and allowing DOD to tap into commercial technology otherwise unavailable. How successful have OTs been in achieving these objectives? One survey respondent stated that DOD doesn't seek out new non-traditional firms as aggressively as it should. Therefore, the second recommendation is to conduct a study to quantitatively determine the extent to which OTs have attracted non-traditional defense prime and subcontractor firms.

This study suggested that buying organizations could submit metric data via the DD Form 2759 and its accompanying data element narrative. The third recommendation is to study how OT metric data could be gathered. Would metric data be precise, valid and accurate, or a burden to collect?

APPENDIX A. CONTRACT MANAGEMENT PERFORMANCE METRICS

Metric	Organization
Funding Documents Received	AFRL
Awards & Modifications Issued	AFRL
Purchase Requests Transmitted	AFRL
Solicitations Issued	AFRL
Solicitations Transmitted to ACO	AFRL
Solicitations Transmitted to Contractors	AFRL
Purchase Requests Transmitted to DFAS	AFRL
Purchase Requests Transmitted to Files/Archives	AFRL
Purchase Requests Transmitted to Originator	AFRL
Reduce Total Ownership Costs (EMD, PRODUCTION, O&S)	ASN
Return on Investment (ROI) [TOC/INVESTMENT]	ASN
Reduce Major Product Cycle Time (Time to Develop and Field System)	ASN
Reduce Time to Develop and Insert New Technologies	ASN
Shorten Product Improvement Cycle (Time to Develop and Field Major Modifications)	ASN
Active Suppliers per Professional Purchasing Employee	CAPS
Active Suppliers per Purchasing Employee	CAPS
Percent of Purchase Transactions Processed through Electronic Commerce	CAPS
Percent of Purchase Transactions Processed via Procurement Card	CAPS
Percent of Services Purchases handled by the Purchasing Department	CAPS
Percent of Total Purchases handled by the Purchasing Department	CAPS
Purchase Dollars per Professional Purchasing Employee	CAPS
Purchase Dollars per Purchasing Employee	CAPS
Purchasing Employees as a Percent of Company Employees	CAPS
Cost To Spend A Dollar	CAPS
Percent of Purchase Dollars Spent with Minority-owned Suppliers	CAPS
Percent of Purchase Dollars Spent with Women-owned Suppliers	CAPS
Purchase Dollars as a Percent of Sales Dollars	CAPS
Purchase Dollars Spent per Active Supplier	CAPS
Purchase Operating Expense Dollars as a Percent of Sales Dollars	CAPS
Purchasing Operating Expense Dollars per Active	CAPS

Supplier	
Change in Number of Active Suppliers During the Reporting Period	CAPS
Percent of Active Suppliers Accounting for 90 Percent of Purchase Dollars	CAPS
Sales Dollar per Purchasing Employee	CAPS
Average Annual Training Hours per Professional Purchasing Employee	CAPS
Purchase Order Cycle Time (days)	CAPS
M/C Request for Waivers/Request For Deviations per 1,000 Contracts	DCMC
Major Software Recommendations Adopted	DCMC
Corrective Action Request Cost Avoidance	DCMC
Quantity of Overage Contracts for Closure	DCMC
Unliquidated Amount of Prime Contracts On-Hand	DCMC
Amount of Loss, Damage and Destruction (LDD)	DCMC
Contracting Officer Price Negotiations Savings and Avoidance	DCMC
Cost Overruns on Major Programs	DCMC
Litigation Cost Savings and Avoidance	DCMC
Percent of Excess Property Reutilized and Sales Proceeds	DCMC
Process Improvement Cost Savings and Avoidance	DCMC
Quantity of Price Negotiations (Used to monitor cost of negotiations)	DCMC
Contractors Assigned Prime Contracts	DCMC
Obligated Amount of Prime Contracts On-Hand	DCMC
Prime Contracts On-Hand	DCMC
Completeness of the Contractor Alert List (CAL)	DCMC
Customer Satisfaction Rating	DCMC
Grievances	DCMC
Contract Closeout Cycle Time	DCMC
Delivery Forecast Timeliness	DCMC
Negotiation Cycle Time	DCMC
Percent of Schedules On-Time	DCMC
Response Time to Customer Priority Surveillance System (CPSS) Requests	DCMC
Schedule Slippage's on Major Programs	DCMC
Product Availability	DLA
RFP Review Participation	DLA
Customer Satisfaction	DLA
On-Time Contractor Delivery	DLA
Logistics Response Time	DLA
Oversight of Management of Prime Contractor	DOE

Compliance	
Percent of Acquisitions Awarded to SDB and Women-owned Business	DOE
Percent of Non-competitive Acquisitions Documented with Justification	DOE
Percent of Total Subcontract Dollars Awarded on Competitive Basis	DOE
Identify Processes Used to Reduce Cycle Time and Operating Costs	DOE
Responsiveness of DM Organizations Pertaining to DOE Directions	DOE
Percent of Acquisitions Processed within Established Lead Times	DOE
Competition	NASA
Extent of Commercial Items Procurement	NASA
Performance-Based Contracting (Extent of use)	NASA
Support to Socio-economic Programs	NASA
Total number of 1100 series personnel (engaged in combination of award and administration)	NASA
Ratio of Personnel to Actions (1:XX)	NASA
Electronic Commerce (EC)	NASA
Cost-to-Manage	NASA
Financial Actions (New Awards and Modifications)	NASA
Unliquidated Obligations (ULOs)	NASA
New Contracts, Competitive/Non-Competitive	NASA
Modifications, Administrative/Incremental Funding/Other "Dollar" Modifications	NASA
Actions under $100K (Purchase Orders, Simplified Acquisitions)	NASA
New Financial Assistance Instruments (Grants, Cooperative Agreements)	NASA
Modifications to Financial Assistance Instruments	NASA
Other Intra-governmental, Space Act agreements, Orders under FSS	NASA
Close-out - Number of awards pending	NASA
Close-out, volume	NASA
Consolidated Contracting Initiative (CCI)	NASA
Contract actions (New awards and modifications)	NASA
Other Actions	NASA
Procurement Workload	NASA
Purchase Orders/Simplified Acquisitions	NASA
Customer Satisfaction	NASA
GAO/Agency Protests	NASA
Procurement Training	NASA
Award Fee, Timeliness of Payment	NASA
Close-out (Timeliness)	NASA

DCAA Audits (Timeliness of audit resolution)	NASA
Lead Time	NASA
Undefinitized Contract Actions (UCAs)	NASA
Actual Awards Compared to Execution Plan Goals	NAVICP
Counts of WIP By Contracting Departments, Divisions and Buyers	NAVICP
List of Top ACOs with Outstanding Terminations	NAVICP
List of Top ACOs with Outstanding UCAs	NAVICP
List of Top Contractors with Outstanding Terminations	NAVICP
List of Top Contractors with Outstanding Undefinitized Contractual Actions (UCAs)	NAVICP
Detailed Automated Work In Process Database	NAVICP
Detailed Manual Work In Process Database	NAVICP
Dollar Values and Counts of Deobligations	NAVICP
Dollar Values and Counts of Outstanding Contracts and Outstanding Contracts w/Back Orders	NAVICP
Dollar Values and Counts of Outstanding UCAs By Weapon System Teams	NAVICP
Dollar Values and Counts of Overage Procurements	NAVICP
Dollar Values of Receipts, Pre Award DTs, Obligations, Credits and Work In Process	NAVICP
Counts of Work In Process (WIP) By Procurement Types and By Various Age	NAVICP
Dollar Values and Counts of Completed Actions (Awards)	NAVICP
Dollar Values and Counts of New Work In Process Receipts	NAVICP
Dollar Values and Counts of Post Award DTs	NAVICP
Obligations summaries by Procurement Type (Repair or Spares) and Budget Plan (BP)	NAVICP
Averages of Procurement Administrative Lead Time (PALT)	NAVICP
Counts of Overage WIP By Contracting Departments, Divisions and Buyers	NAVICP
Counts of Overage WIP By Weapon System Teams	NAVICP
Detailed Delinquent Contracts with Back Orders	NAVICP
Detailed Outstanding UCAs Database	NAVICP
HQ Contracting Actions vs. NAVSEA 02 Staffing	NAVSEA
NAVSEA 02 Manning	NAVSEA
Paperless Acquisition	NAVSEA
Top Five Contractors by Dollar (Post COFD)	NAVSEA
Top Five Contractors by Dollar (Pre COFD)	NAVSEA
HQ and Field Competitive Awards (Percent of Dollars Obligated)	NAVSEA

Purchase Card Sales & Delinquencies	NAVSEA
Purchasing Costs in Cents per Dollar Obligated	NAVSEA
Field Contract Awards (Dollars & Actions)	NAVSEA
HQ Contract Awards (Dollars & Actions)	NAVSEA
Accessibility of Senior People	NAVSEA
Attitude, Responsiveness, Accountability	NAVSEA
Comparison to similar Government Activities	NAVSEA
Keeping you informed	NAVSEA
Quality of Work	NAVSEA
Technical Capabilities	NAVSEA
Value Received	NAVSEA
Contract Cases in Litigation (ASBCA, COFC, Appellate Courts, District Courts)	NAVSEA
Customer Survey Results	NAVSEA
GAO Protest (HQ & Field)	NAVSEA
REA & Claims at HQ/Field (Pre-COFD, Post-COFD)	NAVSEA
Shipbuilder's Disputes in Contract Litigation (FY)	NAVSEA
Timeliness	NAVSEA
Pre & Post COFD (Dollars) and Pre COFD Aged Analysis	NAVSEA
REA & Claims at HQ/Field >3 years old	NAVSEA
REA & Claims at HQ/Field 1-2 years old	NAVSEA
REA & Claims at HQ/Field 2-3 years old	NAVSEA
UCA (Total & >180 Days)	NAVSEA
Best and Final Offers (BAFO) Report of Multiple issuance	NAVSUP
Competition	NAVSUP
Competition Goals	NAVSUP
Competition Initiatives	NAVSUP
Purchase Card - Express Software Requests	NAVSUP
Small Business Goals	NAVSUP
Contracting Authority	NAVSUP
Electronic Data Interchange	NAVSUP
Paperless Acquisition	NAVSUP
Staffing	NAVSUP
Workload And Staffing	NAVSUP
Cost To Obligate $1	NAVSUP
Other Than Purchase Card By $$	NAVSUP
Purchase Card - Delinquencies > 90 Days Credit Balance Invoices	NAVSUP
Purchase Card - Delinquencies > 90 Days Debit Balance Invoices	NAVSUP
Purchase Card - Delinquencies > 90 Days Zero Balances (Interest Only) Invoices	NAVSUP
Purchase Card - Delinquency By Claimant	NAVSUP
Purchase Card - Delinquency Tiger Team	NAVSUP
Contract Actions	NAVSUP

Contract Close-out (volume)	NAVSUP
Extraordinary Contractual Actions	NAVSUP
Government Property	NAVSUP
Other Than Purchase Card	NAVSUP
Purchase Card - Growth (DoD Actions/Card Holders/Sales)	NAVSUP
Purchase Card - Growth (Navy Actions/Card Holders/Sales)	NAVSUP
Purchase Card -Usage Afloat	NAVSUP
Simplified Acquisition Procedures - Actions	NAVSUP
Claims	NAVSUP
Contract Audit Follow Up	NAVSUP
Customer Sat Ratings	NAVSUP
Customer Service	NAVSUP
Customer Service Standards	NAVSUP
Procurement Management Review(PMR)	NAVSUP
Red/Yellow/Green	NAVSUP
Contract Close-out (Timeliness)	NAVSUP
Cycle Time Reduction	NAVSUP
PALT - 5 Year History	NAVSUP
PALT - Monthly	NAVSUP
PALT - Pierside	NAVSUP
PALT - Simplified Acquisition $25K - $100K	NAVSUP
Undefinitized Contractual Actions (UCAs)	NAVSUP
Number of Predetermined Pricing Rates - Grants w/Universities	ONR
Reprocurements	ONR
EDI Vouchers Processed	ONR
Manual Vouchers Processed	ONR
Workload ACO FTE Vs Number of Contracts/CA/OTA/Grants	ONR
Workload FTE Vs Awards	ONR
Contractor Performance Assessment Reporting System (Dollar Value of Contracts)	ONR
Purchase Card Obligations	ONR
Contract Awards	ONR
Contractor Performance Assessment Reporting System (Number of Contracts)	ONR
Contractor Performance Assessment Reporting System (Number of Contracts Completed)	ONR
DAU Utilization Rate	ONR
Grants Awards	ONR
Number of Actions - Contracts	ONR
Number of Actions - Cooperative Agreements/OTA	ONR
Number of Actions - Grants	ONR
Purchase Card -Usage	ONR

1102 Certification/DAWIA Training	ONR
Claims	ONR
Protests	ONR
PALT - Contracts	ONR
PALT - Grants	ONR
UCA	ONR
% Contracts Closed Out Automatically	SPAWAR
Dollars Awarded Electronically	SPAWAR
PO Issued Electronically	SPAWAR
Solicitation Posted on WWW	SPAWAR
% Awards/Modifications Transactions Automated	SPAWAR
% Funding Documents Automated	SPAWAR
% PR Automated	SPAWAR
% Solicitations Automated	SPAWAR
Awards and Modifications Transactions Electronic	SPAWAR
Awards and Modifications sent to electronically: Files, Originator, ACO, DFAS Pay, DFAS Accounting, Contractor	SPAWAR
Funding Documents Transmitted	SPAWAR
Funding Documents Transmitted Electronically	SPAWAR
No. Contracts Closed Out Electronically	SPAWAR
No. Receipt transactions Electronic	SPAWAR
PR Transmitted	SPAWAR
PR Transmitted Electronically	SPAWAR
Solicitations Issued Electronically/Orally	SPAWAR
Awards and Modifications Transactions	SPAWAR
No. Contracts Closed Out	SPAWAR
No. Receipt transactions	SPAWAR
Solicitations Issued	SPAWAR

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APPENDIX B. CONTRACT MANAGEMENT METRICS BY MEASUREMENT CLASSIFICATION CATEGORY

Metric		Category
M/C Request for Waivers/Request For Deviations per 1,000 Contracts	DCMC	EFFECT
Major Software Recommendations Adopted	DCMC	EFFECT
Product Availability	DLA	EFFECT
Oversight of Management of Prime Contractor Compliance	DOE	EFFECT
Percent of Acquisitions Awarded to SDB and Women-owned Business	DOE	EFFECT
Percent of Non-competitive Acquisitions Documented with Justification	DOE	EFFECT
Percent of Total Subcontract Dollars Awarded on Competitive Basis	DOE	EFFECT
Competition	NASA	EFFECT
Extent of Commercial Items Procurement	NASA	EFFECT
Performance-Based Contracting (Extent of use)	NASA	EFFECT
Support to Socio-economic Programs	NASA	EFFECT
Actual Awards Compared to Execution Plan Goals	NAVICP	EFFECT
Counts of WIP By Contracting Departments, Divisions and Buyers	NAVICP	EFFECT
List of Top ACOs with Outstanding Terminations	NAVICP	EFFECT
List of Top ACOs with Outstanding UCAs	NAVICP	EFFECT
List of Top Contractors with Outstanding Terminations	NAVICP	EFFECT
List of Top Contractors with Outstanding Undefinitized Contractual Actions (UCAs)	NAVICP	EFFECT
Best and Final Offers (BAFO) - Report of Multiple issuance	NAVSUP	EFFECT
Competition	NAVSUP	EFFECT
Competition Goals	NAVSUP	EFFECT
Competition Initiatives	NAVSUP	EFFECT
Purchase Card - Express Software Requests	NAVSUP	EFFECT
Small Business Goals	NAVSUP	EFFECT
Number of Predetermined Pricing Rates - Grants w/Universities	ONR	EFFECT
Reprocurements	ONR	EFFECT
% Contracts Closed Out Automatically	SPAWAR	EFFECT
Identify Processes Used to Reduce Cycle Time and Operating Costs	DOE	EFFICIENCY
Active Suppliers per Professional Purchasing Employee	CAPS	EFFICIENCY
Active Suppliers per Purchasing Employee	CAPS	EFFICIENCY
Percent of Purchase Transactions Processed through Electronic Commerce	CAPS	EFFICIENCY
Percent of Purchase Transactions Processed via Procurement Card	CAPS	EFFICIENCY
Percent of Services Purchases handled by the Purchasing Department	CAPS	EFFICIENCY
Percent of Total Purchases handled by the Purchasing Department	CAPS	EFFICIENCY
Purchase Dollars per Professional Purchasing Employee	CAPS	EFFICIENCY
Purchase Dollars per Purchasing Employee	CAPS	EFFICIENCY
Purchasing Employees as a Percent of Company Employee	CAPS	EFFICIENCY

Corrective Action Request Cost Avoidance	DCMC	EFFICIENCY
Quantity of Overage Contracts for Closure	DCMC	EFFICIENCY
Unliquidated Amount of Prime Contracts On-Hand	DCMC	EFFICIENCY
RFP Review Participation	DLA	EFFICIENCY
Electronic Commerce (EC)	NASA	EFFICIENCY
Ratio of Personnel to Actions (1:XX)	NASA	EFFICIENCY
Total number of 1100 series personnel (engaged in combination of award and administration)	NASA	EFFICIENCY
Detailed Automated Work In Process Database	NAVICP	EFFICIENCY
Detailed Manual Work In Process Database	NAVICP	EFFICIENCY
HQ Contracting Actions vs. NAVSEA 02 Staffing	NAVSEA	EFFICIENCY
NAVSEA 02 Manning	NAVSEA	EFFICIENCY
Paperless Acquisition	NAVSEA	EFFICIENCY
Contracting Authority	NAVSUP	EFFICIENCY
Electronic Data Interchange	NAVSUP	EFFICIENCY
Paperless Acquisition	NAVSUP	EFFICIENCY
Staffing	NAVSUP	EFFICIENCY
Workload And Staffing	NAVSUP	EFFICIENCY
EDI Vouchers Processed	ONR	EFFICIENCY
Manual Vouchers Processed	ONR	EFFICIENCY
Workload ACO FTE Vs Number of Contracts/CA/OTA/Grants	ONR	EFFICIENCY
Workload FTE Vs Awards	ONR	EFFICIENCY
% Awards/Modifications Transactions Automated	SPAWAR	EFFICIENCY
% Funding Documents Automated	SPAWAR	EFFICIENCY
% PR Automated	SPAWAR	EFFICIENCY
% Solicitations Automated	SPAWAR	EFFICIENCY
Awards and Modifications Transactions Electronic	SPAWAR	EFFICIENCY
Awards and Modifications sent to electronically: Files, Originator, ACO, DFAS Pay, DFAS Accounting, Contractor	SPAWAR	EFFICIENCY
Dollars Awarded Electronically	SPAWAR	EFFICIENCY
Funding Documents Transmitted	SPAWAR	EFFICIENCY
Funding Documents Transmitted Electronically	SPAWAR	EFFICIENCY
No. Contracts Closed Out Electronically	SPAWAR	EFFICIENCY
No. Receipt transactions Electronic	SPAWAR	EFFICIENCY
PO Issued Electronically	SPAWAR	EFFICIENCY
PR Transmitted	SPAWAR	EFFICIENCY
PR Transmitted Electronically	SPAWAR	EFFICIENCY
Solicitation Posted on WWW	SPAWAR	EFFICIENCY
Solicitations Issued Electronically/Orally	SPAWAR	EFFICIENCY
Funding Documents Received	AFRL	FINANCIAL
Reduce Total Ownership Costs (Development, Acquisition, O&S)	ASN	FINANCIAL
Return on Investment (ROI) [TOC/INVESTMENT]	ASN	FINANCIAL
Cost To Spend A Dollar	CAPS	FINANCIAL
Percent of Purchase Dollars Spent with Minority-owned Suppliers	CAPS	FINANCIAL
Percent of Purchase Dollars Spent with Women-owned Suppliers	CAPS	FINANCIAL
Purchase Dollars as a Percent of Sales Dollars	CAPS	FINANCIAL
Purchase Dollars Spent per Active Supplier	CAPS	FINANCIAL
Purchase Operating Expense Dollars as a Percent of Sales Dollars	CAPS	FINANCIAL
Purchasing Operating Expense Dollars per Active Supplier	CAPS	FINANCIAL

Amount of Loss, Damage and Destruction (LDD)	DCMC	FINANCIAL
Contracting Officer Price Negotiations Savings and Avoidance	DCMC	FINANCIAL
Cost Overruns on Major Programs	DCMC	FINANCIAL
Litigation Cost Savings and Avoidance	DCMC	FINANCIAL
Percent of Excess Property Reutilized and Sales Proceeds	DCMC	FINANCIAL
Process Improvement Cost Savings and Avoidance	DCMC	FINANCIAL
Quantity of Price Negotiations (Used to monitor cost of negotiations)	DCMC	FINANCIAL
Cost-to-Manage	NASA	FINANCIAL
Financial Actions (New Awards and Modifications)	NASA	FINANCIAL
Unliquidated Obligations (ULOs)	NASA	FINANCIAL
Dollar Values and Counts of Deobligations	NAVICP	FINANCIAL
Dollar Values and Counts of Outstanding Contracts and Outstanding Contracts w/Back Orders	NAVICP	FINANCIAL
Dollar Values and Counts of Outstanding UCAs By Weapon System Teams	NAVICP	FINANCIAL
Dollar Values and Counts of Overage Procurements	NAVICP	FINANCIAL
Dollar Values of Receipts, Pre Award DTs, Obligations, Credits and Work In Process	NAVICP	FINANCIAL
HQ and Field Competitive Awards (Percent of Dollars Obligated)	NAVSEA	FINANCIAL
Purchase Card Sales & Delinquencies	NAVSEA	FINANCIAL
Purchasing Costs in Cents per Dollar Obligated	NAVSEA	FINANCIAL
Top Five Contractors by Dollar (Post COFD)	NAVSEA	FINANCIAL
Top Five Contractors by Dollar (Pre COFD)	NAVSEA	FINANCIAL
Cost To Obligate $1	NAVSUP	FINANCIAL
Other Than Purchase Card By $$	NAVSUP	FINANCIAL
Purchase Card - Delinquencies > 90 Days Credit Balance Invoices	NAVSUP	FINANCIAL
Purchase Card - Delinquencies > 90 Days Debit Balance Invoices	NAVSUP	FINANCIAL
Purchase Card - Delinquencies > 90 Days Zero Balances (Interest Only) Invoices	NAVSUP	FINANCIAL
Purchase Card - Delinquency By Claimant	NAVSUP	FINANCIAL
Purchase Card - Delinquency Tiger Team	NAVSUP	FINANCIAL
Contractor Performance Assessment Reporting System - Dollar Value of Contracts	ONR	FINANCIAL
Purchase Card -Obligations	ONR	FINANCIAL
Awards & Modifications Issued	AFRL	PRODUCT
Purchase Requests Transmitted	AFRL	PRODUCT
Solicitations Issued	AFRL	PRODUCT
Change in Number of Active Suppliers During the Reporting Period	CAPS	PRODUCT
Percent of Active Suppliers Accounting for 90 Percent of Purchase Dollars	CAPS	PRODUCT
Sales Dollar per Purchasing Employee	CAPS	PRODUCT
Contractors Assigned Prime Contracts	DCMC	PRODUCT
Obligated Amount of Prime Contracts On-Hand	DCMC	PRODUCT
Prime Contracts On-Hand	DCMC	PRODUCT
Actions under $100K (Purchase Orders, Simplified Acquisitions)	NASA	PRODUCT
Close-out - Number of awards pending	NASA	PRODUCT
Close-out, volume	NASA	PRODUCT
Consolidated Contracting Initiative (CCI)	NASA	PRODUCT

Contract actions (New awards and modifications)	NASA	PRODUCT
Modifications to Financial Assistance Instruments	NASA	PRODUCT
Modifications, Administrative/Incremental Funding/Other "Dollar" Modifications	NASA	PRODUCT
New Contracts, Competitive/Non-Competitive	NASA	PRODUCT
New Financial Assistance Instruments (Grants, Cooperative Agreements)	NASA	PRODUCT
Other (Intra-Governmental, Space Act agreements, Orders under FSS)	NASA	PRODUCT
Other Actions	NASA	PRODUCT
Procurement Workload	NASA	PRODUCT
Purchase Orders/Simplified Acquisitions	NASA	PRODUCT
Counts of Work In Process (WIP) By Procurement Types and By Various Age	NAVICP	PRODUCT
Dollar Values and Counts of Completed Actions (Awards)	NAVICP	PRODUCT
Dollar Values and Counts of New Work In Process Receipts	NAVICP	PRODUCT
Dollar Values and Counts of Post Award DTs	NAVICP	PRODUCT
Obligations summaries by Procurement Type (Repair or Spares) and Budget Plan (BP)	NAVICP	PRODUCT
Field Contract Awards (Dollars & Actions)	NAVSEA	PRODUCT
HQ Contract Awards (Dollars & Actions)	NAVSEA	PRODUCT
Contract Actions	NAVSUP	PRODUCT
Contract Close-out (volume)	NAVSUP	PRODUCT
Extraordinary Contractual Actions	NAVSUP	PRODUCT
Government Property	NAVSUP	PRODUCT
Other Than Purchase Card	NAVSUP	PRODUCT
Purchase Card - Growth (DoD Actions/Card Holders/Sales)	NAVSUP	PRODUCT
Purchase Card - Growth (Navy Actions/Card Holders/Sales)	NAVSUP	PRODUCT
Purchase Card -Usage Afloat	NAVSUP	PRODUCT
Simplified Acquisition Procedures - Actions	NAVSUP	PRODUCT
Contract Awards	ONR	PRODUCT
Contractor Performance Assessment Reporting System - Number of Contracts	ONR	PRODUCT
Contractor Performance Assessment Reporting System - Number of Contracts Completed	ONR	PRODUCT
DAU Utilization Rate	ONR	PRODUCT
Grants Awards	ONR	PRODUCT
Number of Actions - Contracts	ONR	PRODUCT
Number of Actions - Cooperative Agreements/OTA	ONR	PRODUCT
Number of Actions - Grants	ONR	PRODUCT
Purchase Card -Usage	ONR	PRODUCT
Awards and Modifications Transactions	SPAWAR	PRODUCT
No. Contracts Closed Out	SPAWAR	PRODUCT
No. Receipt transactions	SPAWAR	PRODUCT
Solicitations Issued	SPAWAR	PRODUCT
Average Annual Training Hours per Professional Purchasing Employee	CAPS	QUALITY
Completeness of the Contractor Alert List (CAL)	DCMC	QUALITY
Customer Satisfaction Rating	DCMC	QUALITY
Grievances	DCMC	QUALITY
Customer Satisfaction	DLA	QUALITY
On-Time Contractor Delivery	DLA	QUALITY

Responsiveness of DM Organizations Pertaining to DOE Directions	DOE	QUALITY
Customer Satisfaction	NASA	QUALITY
GAO/Agency Protests	NASA	QUALITY
Procurement Training	NASA	QUALITY
Accessibility of Senior People	NAVSEA	QUALITY
Attitude, Responsiveness, Accountability	NAVSEA	QUALITY
Comparison to similar Government Activities	NAVSEA	QUALITY
Contract Cases in Litigation (ASBCA, COFC, Appellate Courts, District Courts)	NAVSEA	QUALITY
Customer Survey Results	NAVSEA	QUALITY
GAO Protest (HQ & Field)	NAVSEA	QUALITY
Keeping you informed	NAVSEA	QUALITY
Quality of Work	NAVSEA	QUALITY
REA & Claims at HQ/Field (Pre-COFD, Post-COFD)	NAVSEA	QUALITY
Shipbuilder's Disputes in Contract Litigation (FY)	NAVSEA	QUALITY
Technical Capabilities	NAVSEA	QUALITY
Value Received	NAVSEA	QUALITY
Claims	NAVSUP	QUALITY
Contract Audit Follow Up	NAVSUP	QUALITY
Customer Sat Ratings	NAVSUP	QUALITY
Customer Service	NAVSUP	QUALITY
Customer Service Standards	NAVSUP	QUALITY
Procurement Management Review(PMR)	NAVSUP	QUALITY
Red/Yellow/Green	NAVSUP	QUALITY
1102 Certification/DAWIA Training	ONR	QUALITY
Claims	ONR	QUALITY
Protests	ONR	QUALITY
Purchase Requests Transmitted to DFAS	AFRL	TIME
Purchase Requests Transmitted to Files/Archives	AFRL	TIME
Purchase Requests Transmitted to Originator	AFRL	TIME
Solicitations Transmitted to ACO	AFRL	TIME
Solicitations Transmitted to Contractors	AFRL	TIME
Reduce Major Product Cycle Time - Time to Develop and Field System	ASN	TIME
Reduce Time to Develop and Insert New Technologies	ASN	TIME
Shorten Product Improvement Cycle - Time to Develop and Field Major Modifications	ASN	TIME
Purchase Order Cycle Time (days)	CAPS	TIME
Contract Closeout Cycle Time	DCMC	TIME
Delivery Forecast Timeliness	DCMC	TIME
Negotiation Cycle Time	DCMC	TIME
Percent of Schedules On-Time	DCMC	TIME
Response Time to Customer Priority Surveillance System (CPSS) Requests	DCMC	TIME
Schedule Slippage's on Major Programs	DCMC	TIME
Logistics Response Time	DLA	TIME
Percent of Acquisitions Processed within Established Lead Times	DOE	TIME
Award Fee, Timeliness of Payment	NASA	TIME
Close-out (Timeliness)	NASA	TIME
DCAA Audits (Timeliness of audit resolution)	NASA	TIME
Lead Time	NASA	TIME
Undefinitized Contract Actions (UCAs)	NASA	TIME
Averages of Procurement Administrative Lead Time (PALT)	NAVICP	TIME

Counts of Overage WIP By Contracting Departments, Divisions and Buyers	NAVICP	TIME
Counts of Overage WIP By Weapon System Teams	NAVICP	TIME
Detailed Delinquent Contracts with Back Orders	NAVICP	TIME
Detailed Outstanding UCAs Database	NAVICP	TIME
Pre & Post COFD (Dollars) and Pre COFD Aged Analysis	NAVSEA	TIME
REA & Claims at HQ/Field >3 years old	NAVSEA	TIME
REA & Claims at HQ/Field 1-2 years old	NAVSEA	TIME
REA & Claims at HQ/Field 2-3 years old	NAVSEA	TIME
Timeliness	NAVSEA	TIME
UCA (Total & >180 Days)	NAVSEA	TIME
Contract Close-out (timeliness)	NAVSUP	TIME
Cycle Time Reduction	NAVSUP	TIME
PALT - 5 Year History	NAVSUP	TIME
PALT - Monthly	NAVSUP	TIME
PALT - Pierside	NAVSUP	TIME
PALT - Simplified Acquisition $25K - $100K	NAVSUP	TIME
Undefinitized Contractual Actions (UCAs)	NAVSUP	TIME
PALT - Contracts	ONR	TIME
PALT - Grants	ONR	TIME
UCA	ONR	TIME

APPENDIX C. TWENTY-FIVE STANDARD CONTRACT METRICS SUBJECTIVELY DETERMINED TO BE MOST RELEVANT TO MEASURING SECTION 845 0THER TRANSACTIONS

METRIC	CATEGORY	ACTIVITY
Awards and Modifications Issued	EFFECT	AFRL
Competition Goals	EFFECT	NAVSUP
Active Suppliers Per Purchasing Employee	EFFICIENCY	CAPS
Workload And Staffing	EFFICIENCY	NAVSUP
Reduce Total Ownership Costs (TOC): Development, Acquisition, O&S	FINANCIAL	ASN
Return-On-Investment (ROI) [TOC/INVESTMENT]	FINANCIAL	ASN
Cost-To-Spend A Dollar	FINANCIAL	CAPS
Cost-To-Manage	FINANCIAL	NASA
Solicitations Issued	PRODUCT	AFRL
Contractors Assigned Prime Contracts	PRODUCT	DCMC
New Contracts, Competitive/Non-Competitive	PRODUCT	NASA
New Financial Assistance Instruments (Grants, Cooperative Agreements)	PRODUCT	NASA
Contract Awards	PRODUCT	ONR
Customer Satisfaction	QUALITY	NAVSEA
Value Received	QUALITY	NAVSEA
Customer Service	QUALITY	NAVSUP
Reduce Time to Develop and Insert New Technologies	TIME	ASN
Reduce Major Product Cycle Time (Time to Develop & Field Major System)	TIME	ASN
Shorten Product Improvement Cycle (Time to Develop & Field Major Modifications)	TIME	ASN
Purchase Order Cycle Time (Days)	TIME	CAPS
Negotiation Cycle Time	TIME	DCMC
Lead Time	TIME	NASA
Timeliness	TIME	NAVSEA
Cycle Time Reduction	TIME	NAVSUP
Procurement Administration Lead Time (Contracts)	TIME	ONR

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APPENDIX D. TERMS AND DEFINITIONS

1. **Other Transactions (OT) for Research**: OTs are cost shared agreements that support basic, applied and advanced research. They are funding transactions that are not contracts, grants, or cooperative agreements. This type of OT authority has generally been used to enter into dual-use research projects. [Ref. 29]

2. **Section 845 Other Transactions**: Also referred to as "Other Transactions for Prototypes", are directly relevant to weapons or weapons systems prototypes proposed to be acquired or developed by Department of Defense (DOD). [Ref. 29]

3. **Contracts**: Are a mutually binding legal relationship obligating the seller to furnish the supplies or services (including construction) and the buyer to pay for them. It includes all types of commitments that obligate the Government to an expenditure of appropriated funds and that, except as otherwise authorized, are in writing. Contracts can be cost sharing instruments, but are normally solely funded by the government. Contracts *do not include grants and cooperative agreements* covered by 31 U.S.C. 6301. [Ref. DOD 7000.14-R]

4. **Grant**: Grants are assistance awards for which no substantial involvement is anticipated between the Department of Defense and the recipient during performance of the contemplated activity. [Ref. FAR Part 2]

5. **Cooperative Agreement**: Unlike grants, cooperative agreements require substantial involvement on the part of DOD. Recipients of DOD grants and cooperative agreements include individuals, nonprofit organizations, local and state governments, U.S. territories, and federally recognized tribal governments. [Ref. FAR Part 2]

6. **What grants and cooperative agreements are not:** Because they are assistance instruments, rather than acquisition instruments, they are subject to a different set of rules and laws than the procurement laws and FAR. They do not include; (1) technical assistance programs that provide services instead of money; (2) contracts that are entered into and administered under procurement laws and regulations; and (3) agreements under which only direct cash assistance to individuals, a subsidy, a loan, a loan guarantee, or insurance is provided. [Ref. FAR Part 2]

LIST OF REFERENCES

1. U.S. Department of Defense, *Integrated Product Team Final Report on the Services Use of 10 U.S.C 2371 Other Transactions and 845 Prototype Authorities*, June 1996.

2. Brooks, T., Office of the Under Secretary of Defense, Acquisition & Technology OUSD (A&T), telephone interview with author on July 26, 1999.

3. 10 U.S. Code 2371.

4. Schwartzwalder, S., Air Force Research Laboratory/PK, "Other Transactions for Prototypes - Non-FAR Procurement Agreements," Defense Acquisition Deskbook, March 1999.

5. Tronic, D., Office of the Assistant Secretary of Defense, Acquisition & Technology (OSD A&T), Acquisition & Business Management (ABM) Staff, telephone interview with author on November 30, 1998.

6. U.S. Depart of Defense, Inspector General, Audit Report 98-191 on *Financial and Cost Aspects of Other Transactions*, Government Printing Office, Washington, D.C., August 24, 1998.

7. Howell, Robert E., *Using "Other Transactions" as an effective R&D Contractual Vehicle*, Master's Thesis, Naval Postgraduate School, Monterey, CA, December 1997.

8. Slade, William C., *Other Transactions for Prototypes as used in the Commercial Operations and Support Savings Initiative 1997: A Contractor's Perspective*, Master's Thesis, Naval Postgraduate School, Monterey, CA, June 1998.

9. Hayes, William P., *Decision Model for Using Other Transactions at DOD Buying Commands*, Master's Thesis, Naval Postgraduate School, Monterey, CA, December 1998.

10. Department of Defense 5000 Series, 5000.1 Directive, Section D., Policy 1.f, *Cost as an Independent Variable (CAIV)*, March 1996.

11. Kamanski, P., Office of the Under Secretary of Defense for Acquisition and Technology (OSD A&T), *FY 1996 DoD RDT&E Program presented to the Research and Development Subcommittee of the House Committee on National Security*, www.acq.osd.mil, March 28, 1995.

12. The White House, A National Security Strategy for a New Century, Government Printing Office, Washington, D.C., October 1998.

13. http://dtic.mil/doctrine/jv2010, *Joint Vision 2010*.

14. H. Lee Buchanan, Assistant Secretary of the Navy for Research, Development and Acquisition, *Naval Research, Development and Acquisition Team Strategic Plan 1999-2004*, January 1999, photocopied.

15. Chen, K., "Pentagon Finds Fewer Firms Want to Do Military R&D," *Wall Street Journal*, October 27, 1999.

16. Dunn, R. and Dees, C., "Point/Counterpoint: Debate on the extension of Other Transactions Authority," *The Government Contractor*, Vol. 39, No. 33, pp. 3-8, August 27, 1997.

17. Joint Chiefs of Staff, *Concept for Future Joint Operations, Joint Vision 2010*, Government Printing Office, Washington, D.C., May 1997.

18. General Accounting Office, *Acquiring Research by Nontraditional Means*, NSAID, 96-11, Government Printing Office, Washington, D.C., March 1996.

19. Dunn, R. "DARPA Turns to Other Transactions," *Aerospace America*, pp. 33-37, October 1996.

20. Bolos, J., *The Use of 10 U.S.C. 2371 Other Transaction and Section 845 Authority in the Department of Defense*, http://www.darpa.mil/cmd/pages/toc.html, March 1997.

21. Campisi, G., Program Officer for Dual Use Technology, Defense Advanced Research Projects Agency (DARPA), telephone interview conducted with author on December 4, 1998.

22. Summerill, J., "Deregulating Government-Sponsored R&D: The Flexibility of "Other Transactions", *Contract Management*, pp. 4-9, October 1996.

23. OMB Circular A-102, "Grants and Cooperative Agreements with State and Local Governments," August 29, 1997, Defense Acquisition Deskbook, Fall 1999.

24. Department of Defense, *Report on "Other Transaction" Awards for Prototype Projects*, Government Printing Office, Washington, D.C., February 26, 1999.

25. http://www.darpa.mil/baa/cossi.html, *Commercial Operations and Support Savings Initiative*, October 28, 1998.

26. Sharkus, D., Deputy Director, Contract Management Directorate, Defense Advanced Research Projects Agency (DARPA), telephone interview conducted with author on September 8, 1999.

27. National Defense Authorization Act for Fiscal Year 2000, Title VIII, section 801, photocopied.

28. Jasper, B., "Other Transactions Are FAR Out!" *National Contract Management Journal*, Volume 29, Issue 2, 1999.

29. Brooks, T., Office of the Under Secretary of Defense, Acquisition & Technology OUSD (A&T), "Background on Section 845 Other Transactions," *Defense Acquisition Deskbook*, Fall 1999.

30. Frank, T., *DCMC finds new ways to support R&D efforts*, http://www.dla.mil/dimensions/janfeb99/ots.htm, February 1999.

31. Burt, David N., and Donald W. Dobler, *Purchasing and Supply Management*, 6th ed. San Francisco: McGraw-Hill, 1996.

32. http://www.oecd.org/puma/mgmtres/pac/key.htm "Performance Metrics", *Organization of Economic Cooperation and Development*, September 4, 1997.

33. Pope, J., *Measuring the effect of the Defense Acquisition Workforce Improvement Act*, Master's Thesis: Naval Postgraduate School, Monterey, CA, June 1997.

34. http://www.orau.gov/PBM/handbook, Training Resources and Data Exchange (TRADE), *How to measure performance: A handbook of techniques and tools*, September 11, 1997.

35. U.S. Air Force Systems Command, *The Metrics Handbook*, Andrews Air Force Base, August 1991, photocopied.

36. U.S. Air Force Material Command, "Conduct of Risk Management", *Risk Management*, AFMC 63-101, 1997.

37. Brown, M., *Keeping Score, Using the Right Metrics to Drive World-Class Performance*, 1st Ed, New York: Quality Resources, 1996.

38. Brache, A.P., and Rummler, G.A., *Improving Performance*, Jossey-Bass Inc, San Francisco, CA: Jossey-Bass Inc, 1990.

39. Gordon, K., *A Metric Evaluation Approach of the Defense Acquisition Workforce Improvement Act*, Master's Thesis, Naval Postgraduate School, Monterey, CA, June 1997.

40. Brinkerhoff, R., and Dressler, D., *Productivity Measurement; A Guide for Managers and Evaluators*, Newbury Park, CA: Sage Publications, 1990.

41. Landy, F., and Farr, J., *The Measurement of Work Performance: Methods, Theory, and Applications*, San Diego, CA: Academic Press, 1983.

42. Sink, D. and Tuttle, T.C., *Planning and measuring in your organization of the future*, Norcross, GA: Institute of Industrial Engineers, 1989.

43. Weidmer, D.L., Navy Inventory Control Point, Contract Policy Staff, telephone interview conducted with author on September 23, 1999.

44. Fearon, H.E. and Bales, B., Center for Advanced Purchasing Studies, *Measures of Purchasing Effectiveness*, 1997, http://www.capresearch.org/research/focuses.

45. Defense Contract Management Command (DCMC), *1999 Metrics Guidebook*, June 1999, http://www.dcmc.hq.dla.mil/teaminfo/aqbd/99plan/METRICS/matrix.htm.

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BIBLIOGRAPHY

Achille, P., Deputy Program Manager (PMA 258), Naval Air Systems Command (NAVAIR), telephone interview conducted with author on December 1, 1998.

U.S. Air Force Material Command, AFMC 63-101, *Risk Management*, 1997, photocopied.

Barnhardt, B., Deputy Director of Contracts, Navy Inventory Control Point, Mechanicsburg, PA, telephone interview conducted with author on September 1, 1999.

Birmingham, R., LCDR, Office of the Assistant Secretary of Navy, Research, Development & Acquisition (ASN RD&A), telephone interview with author on October 15, 1998.

Clubb, D.G., "Blinding Speed Equals Competitive Advantage," *Acquisition Quarterly Review*, Fall 1996.

Dady, M., Deputy Program Manager (PMA 282), Naval Air Systems Command (NAVAIR), telephone interview conducted with author on December 1, 1998.

Department of Defense 7000.14-R, *Financial Management Regulation; Volume 12 Special Accounts Fund and Programs*, CH-5.0501.

Federal Acquisition Regulation.

Fremgen, J., Professor, Naval Postgraduate School, Internal Control and Auditing, MN4151, course attended January-March 1999, *An Introduction to Internal Control and Auditing*, Unpublished manuscript, Naval Postgraduate School, Monterey, CA, January 1999.

Gansler, J., "Defense Conversion: Transforming the Arsenal of Democracy," *Technology Leadership*, Cambridge, MA, MIT Press, 1995.

Hearn, Emmett E., *Federal Acquisition and Contract Management*, California: Hearn Associates, 1996.

Institute for Defense Analysis, *Participant Views of Advanced Research Projects Agency "Other Transactions,"* IDA Document D-1793, November 1995.

Kennedy, C., Team Leader, Defense Contract Management Command, DCMC Seattle, telephone interview conducted with author on December 4, 1998.

Lamm, D., Professor, Naval Postgraduate School, Principles of Contracting and Acquisition, MN3303, course attended September-December 1998.

LaBerge, W., "Cycle Time - A Military Imperative As Well," *Acquisition Review Quarterly*, Fall 1996.

Leaming, F., Director of Planning & Research, Defense Supply Center Richmond, telephone interview conducted with author on July 23, 1999.

Marr, D., Contracting Officer, U.S.M.C. Systems Command, telephone interview conducted with author on December 4, 1998.

Patanito, P., Director of Contracting, Dual Use Technology Program, DDR&E, Washington, D.C., telephone interview with author conducted 13 November 1998.

Perry, W., Office of the Secretary of Defense, *Memorandum to the Secretaries of the Military Departments*, September 14, 1994.

Ruppert, J., CAPT, USN, Director of Acquisition, Office of Naval Research, telephone interview conducted with author on October 13, 1999.

Saric, C., Director of Contracts, National Aeronautics and Space Administration,

Scolpino, B., Deputy for Acquisition Management, Naval Air Systems Command (NAVAIR), telephone interview conducted with author on December 1, 1998.

Sharkus, D., Deputy Director of Contracts, Defense Advanced Research Projects Agency, telephone interview conducted with author on August 13, 1999.

Shaver, C., Contract Specialist (SEA 02), Naval Sea Systems Command (NAVAIR), telephone interview conducted with author on December 4, 1998.

Spreng, R., "Commercial Firms are Conspicuously Absent from top Defense Contractors." *National Defense*, February 1995.

Spector, E., Director of Defense Procurement, Office of the Under Secretary of Defense, Acquisition & Technology (OUSD [A&T]), personal interview with author on June 25, 1999.

Tronic, D., Office of the Under Secretary of Defense, Research, Development & Acquisition (OSD [A&T]), Acquisition & Business Management (ABM) Staff, telephone interview with author on September 1, 1999.

U.S. Department of the Army, *Memorandum on Authority to Carry Out Certain Prototype Projects*, June 13, 1997.

Valovcin, J., Commander, Contracting Officer, Office of Naval Research (ONR), telephone interview conducted with author on December 1, 1998.

Winters, D., Director of Contracts, Office of Naval Research, telephone interview conducted with author on September 1, 1999.

http://web.deskbook.osd.mil/valhtml/2/22/221/ 221W05.htm *Frontline Wisdom & Advice*. July 1998.

http://www.acq-ref.navy.mil/newsletters/ 9807v5n2.html#2 *Acquisition Reform Update*. July 1998.

http://www.darpa.mil/jdupo/cossi/toc.html *Program Solicitation for the Commercial Operations and Support Savings Initiative: Dual Use Applications Program Solicitation NO. 97-12*, January 1997.

http://afmc.wpafb.af.mil/HQ-AFMC/PK/pkt/index.htm, *Section 845 of Public Law 103-160, Other Transactions for Prototype*, October 23, 1997.

http://www.acq.osd.mil/ar/arbg/arbg97, *Acquisition Reform Benchmarking Group (ABRG) 1997 Final Report*, June 1997.

http://www.dla.mil/Perform%20Report.htm, Defense Logistics Agency, *DLA Performance Report Fiscal Year 1997*, January 1998.

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